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ABSTRACT

This set of proceedings assembles papers presented at the 1995 Council for Higher Education Computing Services (CHECS) conference, held at the New Mexico Military Institute in Roswell, New Mexico. CHECS members are higher education computing services organizations within the state of New Mexico. The main focus of the conference was the Internet and its future, with paper topics including: copyright issues; home page design; access to government information; technical aspects; distance learning; security and privacy; local area network for libraries; education and use of the Internet by adults, by people with disabilities, and in school settings; designing the electronic classroom and communication and collaboration via the Internet. The proceedings include a conference agenda and the full text of 16 of the 28 papers presented at the conference; 12 papers were not submitted for publication. (SWC)

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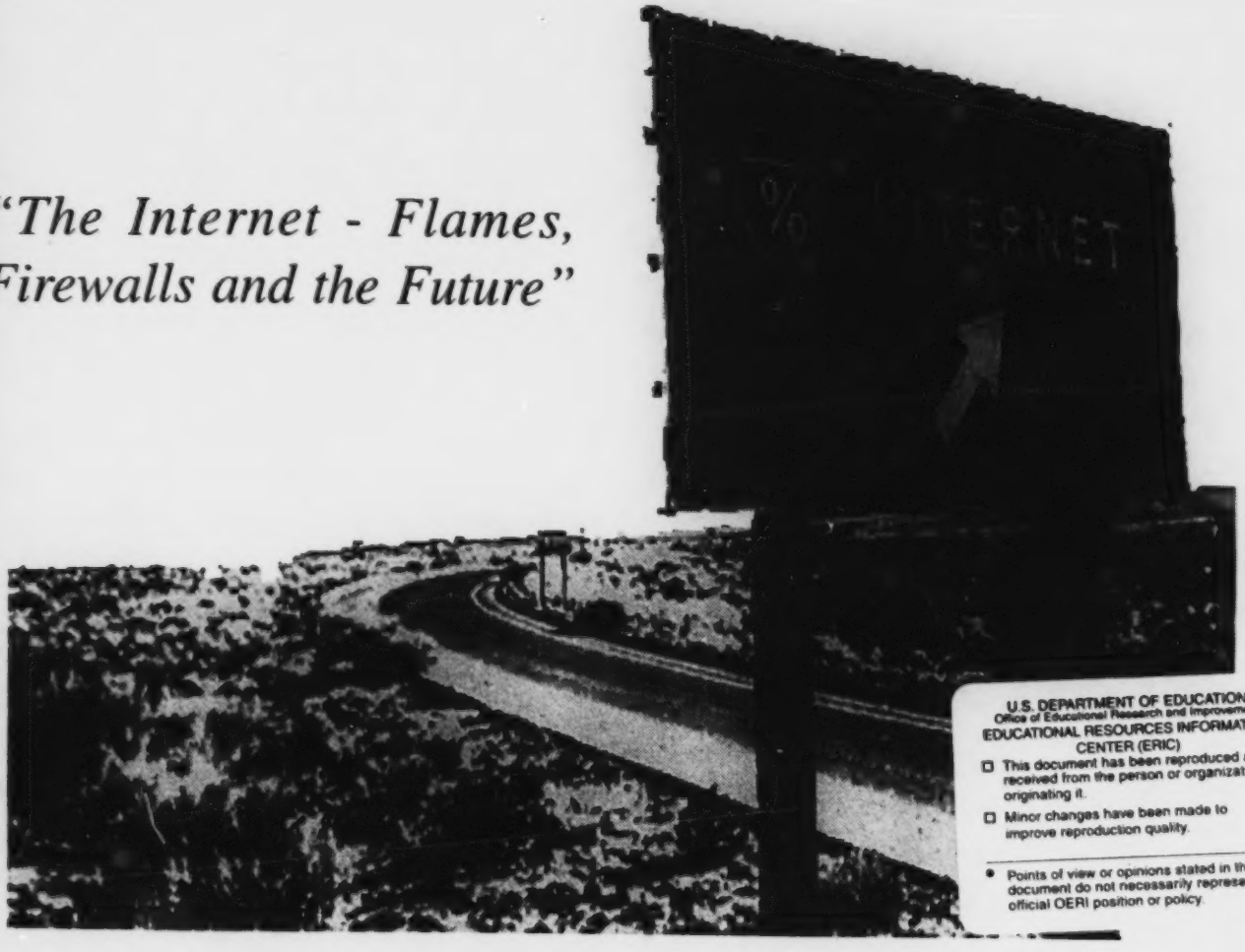
CHECS '95

"The Internet - Flames, Firewalls and the Future"



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Council for Higher Education Computing Services
Proceedings for the 1995 Conference
New Mexico Military Institute
Roswell, New Mexico
November 8-10, 1995

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1995 FALL CHECS CONFERENCE AGENDA

"The Internet - Flames, Firewalls and the Future'
November 8 - 10, 1995
New Mexico Military Institute, Roswell, New Mexico

Thursday November 9, 1995

8:00a.m.	Registration, Coffee, Juice, Pastries
9:00a.m.	Introduction - Bill Siders, President, NM CHECS, Inc.
9:10a.m.	Welcome - Lt. Gen. Winfield Scott, Superintendent, NM Military Inst.
9:40a.m.	Keynote - Ben Wakashige, Library Director, Texas A&M, Corpus Christi
10:40a.m.	Break
11:00a.m.	Introduction of Supercomputing Challenge Winning Team - John Jenkins, Nathan Hillson, and Jason Stetten
12:00noon	Lunch - JRT Hall

Time	Mabee Auditorium (Track 1)	MAC Lab (Track 2)	Room 201 (Track 3)	JRT Hall (Track 4)
1:00 - 2:00	**Copyright in the Pipeline;** An Examination of Distance Learning Issues and Possible Solutions - Glen McKay, NMJC	**A Structured Approach to Homepage Design** - Gwen Gregory & Marlo Brown, Branson Library, NMSU	**Access Is Ownership; American Citizens Become the Public Printer** - Daniel Barkley & Jackie Shane, General Library, UNM	**Configuring the Large LAN for TCP/IP, Appletalk and Novell** - Shaun Cooper, CANTO, NMSU
2:00 - 2:10	**BREAK**			
2:10 - 2:40	**Teaching Internet Use to Adult Learners: The LANL Library Experience** - Sharon Smith & Dan Comstock, Research Library, LANL	**Distance Learning and Libraries in the Cyberspace Age** - Edward Erazo, Library, NMSU	**Local Area Networks; What Can a Library Do With It?** - Melinda Bako Dermody, Library, NMSU - Alamogordo	**Open Internet Access in a Structured School Environment (Controlling Chat Lines During Study Hall)** - Bill Siders, Computer Services, NMMI
2:40 - 2:50	**BREAK**			
2:50 - 3:20	**Information Security Training (How To Educate Your Staff Without Having Nap Time)** - David Grisham, CIRT UNM	**The Internet as a Reference Tool: Accessing Scientific & Technical Information via the World Wide Web** - Mona Mosier, Research Library, LANL	**Designing the Electronic Classroom** - Laural Adams, Library, NMSU	
3:20 - 3:30	**BREAK**			
3:30 - 4:30	**Leveraging Campus Network Capabilities at the Desktop (How Windows Sockets and MacTCP Changed My Life)** - Aaron Ezekiel, CIRT UNM	**A Pretty Good Paper About Pretty Good Privacy** - Roy McCollum, Info. Services, NMSVH	**Three C's at UNM: Communication, Collaboration & Cooperation** - Bill Adkins & Linda Miller, CIRT, UNM	**Does Copyright Infringe on Freedom to Exchange Ideas?** - Barbara Delzell, Engineering Library, NMSU

6:00 pm No Host Bar - Sallyport Inn
7:00 Banquet Dinner - Sallyport Inn (Jazz Band, Drill Team)

1995 FALL CHECS CONFERENCE AGENDA

"The Internet - Flames, Firewalls and the Future"
November 8 - 10, 1995
New Mexico Military Institute, Roswell, New Mexico

Friday November 10, 1995

8:00 a.m. Coffee, Juice and pastries - Toles Learning Center

Time	Mabee Auditorium (Track 1)	MAC Lab (Track 2)	Room 201 (Track 3)	JRT Hall (Track 4)
8:30 - 9:30	**Access to the Internet by People With Disabilities** - Mike Thompson, CANTO NMSU	**WWW at NMSU - Developing Campus Policies and Guidlines** - Shaun Cooper & Brian Ormand, CANTO, NMSU	**Writing Specifications for PC Purchases** - Peter Shkabara, Computer Services, WNMU	**NSF Funding Initiatives in Computing and Networking** - Art St. George, CIRT, UNM
9:30 - 9:40	**BREAK**			
9:40 - 10:10	**Implementing a Groupware Service Request Tracking System (Automating the Computer People)** - Anna Dyson & Brian Ormand	**WWW Homepages: and Examination of Content and Audience** - Betty Reynolds, William Kincade & Kay Krehbiel, Library, NM Tech	**Concrete Results in the Virtual Reality Classroom** - Ester Peralta, UTEP	**Home Pages and Other Things That Go Bump in Cyberspace** - Phillip Escue, Computer Services, NMHU
10:10 - 10:20	**BREAK**			
10:20 - 10:50	**SATAN: What's all the Hype About?** - Jim Herbeck, Computer Science, UNM	**Government Information on the Internet Implications for Libraries and Communities in Eastern New Mexico** - Elizabeth Crowell, Library, ENMU	**Security Practices & Policies (How I Kept My Boss Out of Jail)** - David Grisham, CIRT, UNM	**POISE Bird of Feathers** (General Meeting of NM POISE Users to meet with Campus America Account Manager, Sally Collins)
10:50 - 11:00	**BREAK**			
11:00 - 12:00	**Building Cooperative Networks in New Mexico** - Jeff Harris, CANTO, NMSU			

12:00 noon Awards for Best Presentation and Written Paper - Bill Keehfuss, Program Chair - Toles Learning Center
12:15 Business Meeting - Bill Siders, President, NM CHECS, Inc.

COPYRIGHT IN THE PIPELINE

An Examination of Distance Learning Issues and Possible Solutions

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ABSTRACT

The existing Copyright Act of 1976 makes it virtually impossible for distance educators to transmit audio-visual or non-dramatic, literary works to students through any medium which may be received by the general public. It is a law that perhaps unintentionally discriminates against distant learning students. Certain revisions of the law are needed to make the richness and variety of all copyrighted works available to distance learners. There is no doubt that copyright law is necessary to enable writers and producers to profit from their creations so that they may be given the incentive to produce more works. "Fair use" a concept which originated in the courts, enables the public to benefit from those works without permission of the copyright holder, within certain limits. Non-profit educational institutions are granted much leeway in "fair use" as a result of the Copyright Act, but not enough to meet distance learning needs. The digital age threatens copyright holders due to the ease by which any work may be copied and transmitted electronically. The Working Group on Intellectual Property has proposed revisions of the Copyright Act to protect works in the digital environment. And a coalition of educators and publishers have drafted new guidelines governing use of copyrighted works in "multimedia." One of these guidelines allows for transmissions provided they are accessible only by students. But additional changes in law are needed to loosen some restrictions on the use of works in distance education. And experimentation on a regional scale should be encouraged to test innovative technological strategies that would benefit the distance educator and student while protecting the legitimate interests of the copyright holder.

THE NATURE OF THE PROBLEM

Tales from the murky world of intellectual property...

For the media specialist it is a maddening, torturous scenario: An art professor planning to begin teaching "art appreciation" over cable TV next semester wants to do what he normally does in his classroom: Show high quality videos on art works by Van Gogh, da Vinci, O'Keefe, and a host of other great artists. But the media specialist warns of legal barriers to his efforts-- clearance must be granted for each video before it can be shown on the local cable system. And so the media specialist begins to identify and contact copyright owners to obtain clearances with frustrating results. How frustrating? In some instances the distributor, the one who's selling the work, refuses to identify the copyright owner. The Copyright Clearance Center, which negotiates clearances for print materials, says it "doesn't do videos." A call to a major publisher leads down a complex tree branching of voice mail menus until the call eventually winds up out on a limb. Or, the copyright owner may be overseas, and the call is answered by a voice speaking French, on tape, repeating its message over and over again. On those few occasions when the copyright owner is identified, a letter seeking permission is sent, only to get a terse reply. A copy of the distributor's policy is sent back with areas highlighted in yellow forbidding transmission over a cable TV system. And so, the entire "art appreciation" course looks like it may very well devolve into a "talking head" program with a cablecast reminder to students that they must drive to campus in order to view the films in the college library learning center. So much for distance learning.

How about the nursing professor who wants to show a video on the subject of therapy to her distant students who are watching the course on satellite

television? It's in the law of the land that she can perform that 30-minute educational video to her students in a classroom setting, the Copyright Act of 1976; but it's also in the same law that says she cannot show the video to her students at remote sites linked via satellite, cable TV, fiber optics, microwaves, or any other means of telecommunication. It is a law that, perhaps unintentionally, discriminates against distant education students who are bound by the same demands as "traditional" students.

Two regimes of works in copyright law, but one in the digital age

The digital world could be considered an "equal opportunity" application: All works are treated equally. Regardless of the medium used, they can all be converted to binary language, zero's and one's, and transmitted to a receiving computer where they can be copied or performed, and then reconverted into their analog form which can be perceived by human senses. But while all works receive equal treatment digitally, such is not the case in the legal environment of the Copyright Act. Section 110 of the Act allows you to transmit, without permission, "non-dramatic, literary" works such as print, pictures, charts and maps through a telecommunications system, but only directly to classrooms or to certain individuals who may be disabled. However, the Act completely blocks transmission of any type of work if it can be received by the general public. And as for audio-visual works, the pipeline is closed to any kind of transmission, period. It is a dilemma which is expressed succinctly in a question raised by Arnie Lutzker, an attorney practicing copyright law in Washington D.C.

> When face to face (teaching) expands out of the classroom as it has in distance learning, what can be done with copyrighted materials both as a respect for the rights of copyright owners who have invested and created works for an educational market..., and the need of educators to communicate with students wherever those students may be? ("Multimedia Fair Use Guidelines" teleconference, 9/21/95)

It is a question for which there is no clear cut answer, nor is there likely to be in the latest revisions of copyright law and fair use policies now pending in this country. But there are a few ideas being considered which could lead, perhaps, to the synthesis of a solution that would empower educators and students to avail themselves of the full potential of all copyrighted works in the telecommunications pipeline.

COPYRIGHT POLICIES IN HISTORICAL CONTEXT

There is no argument that a purpose exists for copyright. As long as people earn a living by the sweat of their brow, there will be those who are entitled to profit from the rigorous toil required in the act of creating a picture, a novel, a journal article, a song, or a motion picture. And, as argued publishers and policy-makers alike in many forums, if people cannot benefit financially from the products they have put so much of their time and effort into creating, they will stop trying altogether. The civilized world will become a vacuum devoid of intellectual expression in all its forms. And yet, what good would it do for society as a whole if those works could not be used by those for whom they were created: the public? Such is the dual purpose of copyright law-- to safeguard the interests of both the copyright holder and the user-- since its inception in 1790. The first federal copyright legislation dealt with protecting

ownership of "maps, charts, and books." Each successive iteration of copyright law was designed to accommodate major technological changes in forms of expression: the 1802 law (print technology); the 1909 Act (motion pictures included for the first time), and the current 1976 Act which took into account new reprographic technologies, from photocopying to videotaping (Sinofsky, 4). In the period leading up to 1976, it was videocassette recording and photocopying which made it possible for consumers to seamlessly and rather easily produce copies of works without the expense of buying major production equipment. As we speed headlong into 1996, it's the ability to digitize which has the publishing world in an uproar.

> The establishment of high-speed, high-capacity electronic information systems makes it possible for one individual, with a few key strokes, to deliver perfect copies of digitized works to scores of other individuals--or to upload a copy to a bulletin board or other service where thousands of individuals can download it or print unlimited "hard copies" (Lehman).

To a publisher, this is scary.

Then there is the concept of "fair use" (by the consuming public) to consider. Intending to balance the property rights interests of authors and publishers with the first amendment right to free expression, "fair use" was introduced by American courts early in the nineteenth century. In the recent teleconference on "Multimedia Fair Use Guidelines" (September 21, 1995), Assistant Secretary of Commerce Bruce Lehman, a keynote speaker, summarized the concept of fair use in clear, understandable terms:

> The concept of fair use arose out of tensions between copyright law and the First Amendment, with courts attempting to balance the exclusive rights of copyright owners with the rights of scholars, critics and others to speak and write freely.

"Fair use" rulings surfaced now and again in the courts until it was legislated as Section 107 of the 1976 Act. But it was a faltering attempt, listing criteria for fair use but failing utterly to give a clear definition:

> There is no disposition to freeze the doctrine in the statute, especially during a period of rapid technological change. . . the courts must be free to adapt the doctrine on a case-by-case basis (1976 House Report)."

But the courts have only "adapted" the fair use doctrine in fits and starts, never clearly delineating the boundaries within which fair users may operate free of infringement and the potential for the 1976 Act to bear its teeth. And indeed it does have teeth: $500 to $20,000 dollar fines per infringement of each work; up to $100,000 when the infringement is "willful" (Lutzker). One landmark case (Sony) made it legal for private citizens to tape their favorite shows on their home VCR for "timeshifting" purposes, but yet another case (BOCES) made it patently unlawful for an educational institution to massively and systematically copy audio-visual programs for teaching purposes, as summarized by Sinofsky. For printed works, recent federal court cases appeared to have a chilling effect on photocopying for educational or research purposes. But as legal copyright expert Kenneth Crews indicates, "fair use is alive and well"; the cases pertain to

infringement by commercial users of materials and do not necessarily impact non-profit educational institutions ("Copyright Law, Libraries, and Universities: Overview, Recent Developments, and Future Issues", 1992).

Education and the publishing world have been in a state of tension in varying degrees over fair use issues since intellectual property rights were first legitimized (Sinofsky, 4):

> In fact, fair use is a contradiction of the basic concept of copyright: Copyright grants an author an exclusive monopoly on a particular work; fair use provides that someone other than the author can have certain rights regarding the work. . . without payment to. . . the copyright owner. Is it any wonder, then, that controversy surrounds fair use (10)?"

The powerful tussling between academe and copyright holders apparently resulted in the current 1976 language which represents a compromise. Then in the early 1980's, guidelines for off-air videotaping were agreed upon by constituencies from education and film publishers. Read into the congressional record but never enacted as law, the "Kastenmeier" guidelines allow educators to video record programs off the airwaves and use them in the classroom, twice, within ten days. For another thirty-five days they may keep the program for evaluation but then must purchase the rights to use the program or erase the tape. These guidelines did address timely issues of the day regarding audio-visual works, but by the end of the decade, as distance learning began to explode, new problems were beginning to surface.

THE CLOUDED PRESENT

The past five or six years have seen a blizzard of unresolved questions swirl about the use or performance of copyrighted materials in distance learning, "the transmission of education or instructional programming to geographically dispersed individuals or groups (Sherron)." The term "distance learning" is not meant to pertain only to audio-visual works, but all types of works used in mediated learning: via satellite, cable television, microwave, fiber optics, or "computer mediated distance learning (CMDL)." The mere fact that any copyrighted work, be it print, photographic, or audio-visual can be digitized, transformed, compressed, distributed and reproduced, all virtually without detection, raises fears that copyright is dead or at least gasping its last breath. Some even hold the belief that publishing on the internet is equivalent to giving up your copyright as several e-mail messages to a copyright listserv (CNI-COPYRIGHT@CNI.ORG) would attest. Others, more wisely perhaps, advise a more cautionary stance in view of recent lawsuits and cease and desist letters instigated by authors and publishers who are challenging efforts to publish on "on-line" without permission (Botterbusch, Greguras). Consider recent examples reported in 1995:

- √ The Church of Scientology demanded that Usenet be shut down because some of its documents appeared on-line (Gunn).

- √ Some perpetrator transferred more than 800 works of great literature from a CD-ROM published by World Library, removed the copyright notice, and posted it on the Internet (Coleman, 69).

- ✓ A Star Trek fan somehow accessed the unreleased script to the movie "Star Trek VII, Generations", in digital form, and e-mailed it to 20 of his friends, resulting in a stern call from Paramount (Clark).

- ✓ In apparent response to a lawsuit filed by 8 members of the National Writer's Union against publishing works on-line without permission, publishers are beginning to require authors to sign a release allowing reuse of their works in another medium (Coleman, 70)

It is abundantly clear that the ease and convenience of manipulating information in this digital era is fraught with the risks of piracy, willful or unwillful. Ron Coleman writes in the ABA Journal (July, 1995) that "The copyright laws... first printed centuries ago with hand-set type, no longer seem appropriate for numeric codes and hypertext links (69)." Others, at the highest levels of policy formulation, believe that the Copyright Act of 1976 need only be fine-tuned to become applicable to the digital era. The "Working Group on Intellectual Property Rights" chaired by Assistant Bruce Lehman, Assistant Secretary of Commerce, believes that a free-for-all relaxation of copyright laws on the NII ("Information Superhighway") would lead to a cyberspace version of Dodge City (Lehman, 15). But the Working Group doesn't believe that major changes are needed to protect the legitimate interests of copyright owners:

> With no more than minor clarification and limited amendment, the Copyright Act will provide the necessary balance of protection of rights-- and limitations on those rights-- to promote the progress of science and the useful arts. Existing copyright law needs only the fine tuning that technological advances necessitate, in order to maintain the balance of the law in the face of onrushing technology (Lehman, 17).

The Working Group's recommended policy changes, to be discussed later, appear to address the many concerns of copyright owners and users when it comes to most types of works. But while there is plenty of substance in these recommendations regarding the manipulation of text, graphics, music, and pictorial works that might appear in computer-mediated distance learning, there is very little said about what to do with audio-visual works.

Policy development at the college and university level has found it torturously difficult to deal with distance learning and copyright issues. The University of California system warns the educator to be "fully aware" of infringement potentialities and to abide by license provisions. Similar admonishments or proscriptions can be found in policies adopted by the University of New Mexico and the University of Texas system. Absent those provisions, California recommends "that educators contact the copyright holder in writing for permission to manipulate or use these technologies in alternative ways." However, unless one is fully knowledgeable and intimately acquainted with contacts in the publishing world, getting written permission is analogous to pushing your way through coils of barbed wire.

Scholarly journals only confirm and verify what the distance educator already knows. The University of New Mexico nursing professor can show that therapy video to her nursing students in a "face-to-face teaching activity" but there is no legal way for her to transmit it via satellite to remote learning sites in New Mexico. It has become a hot topic in academic circles; authors in refereed

journals are calling for a reevaluation of certain sections of the 1976 Copyright Act:

> The Copyright Act should encourage the use of any educational materials in distance learning programs. . . course-enriching audio-visual works will only be relevant to students enrolled in the class. . . If professors are forced into the difficult and time-consuming procedure of obtaining permission from owners before using any copyrighted materials in class, students will be disadvantaged (Switzer; Switzer).

And, prominently, copyright expert and law professor Kenneth D. Crews of Indiana University asserts, "I see dist-ed (sic) as an area badly in need of legislative reform." Crews is currently trying to document difficulties faced by educators and media specialists who "are precluded from transmitting video, dramatic readings, etc." (e-mail to McKay, 7/5/95). Crews, who has testified before Clinton administration hearings on intellectual property and has written and lectured widely on the issue, says he will use the information in an effort to change the Copyright Act so that it is more favorable to distance learning.

POLICY FORMULATION IN THE DIGITAL AGE.

There are currently efforts pending to make apparently minor revisions in the Copyright Act of 1976 to enable it to accommodate the rapidly changing technological landscape. The tensions over fair use between the publishing world and the user's world can hardly be discounted in leading up to the current state of affairs. The rift appears strikingly in the debate over intellectual property rights and the development of the National Information Infrastructure (Information Superhighway) proposed by the Clinton administration in 1993. At that time the White House issued marching orders to establish the NII with the professed goal of extending "universal service" to all. Much as the telephone giants achieved their goal of putting a telephone in virtually every home in the U.S., economically, the White House aspires to similar objectives. The theme of avoiding the creation of a society of information "haves and have-nots" appears in the original Fact Sheet on the NII by the Clinton administration. As part of this omnibus effort, the Working Group was convened to deal with intellectual property issues. With the issuance of a so-called "Green Paper" in July, 1994, the battle was joined. In maintaining that the 1976 Copyright Act was sufficient to protect the rights of copyright owners, it also proposed revisions which were hailed by publishers and scorned, by and large, in the educational community. A few snippets of testimony from hearings conducted by the Working Group reveal the tense and conflicting perceptions of copyright among both publishers and users:

> A few taps on a keyboard and up pops a book. A quick scroll through a few pages and there it is, the information you seek. Read it, maybe take some notes or clip it for a term paper. You no longer need that book.

Such is the essence of publisher's concerns, as put by Paul Aiken of the Authors League of America in testimony on the Green Paper recorded Sep. 22, 1994. Aiken even proposed that those who browse information electronically

should be required to do so in a library setting only. Paul Batista, National Vice President for Legislation, representing the Graphic Artists Guild, testified that, "Members of the Graphic Artists Guild have reason to be concerned by the (notion) that the Copyright Act exists for the benefit of the public... Such a view is simplistic at best."

Others might venture to say that such a view as Batista's is simplistic at best, or preposterous at worst. From the academic world came witnesses who testified that fair use is the public's intellectual magna carta, and that "compensation for intellectual property rights should not prohibit the use of visual or textual materials for teaching and scholarly research. (Sandra Walker, President of the International Visual Resources Association)."

Perhaps most alarming was a proposal in the Green Paper to overturn the "first sale" doctrine for transmitted copies of works. This "right of first sale" in Section 109 is what allows purchasers of works to sell, loan, or dispose of works in any way they see fit. The Green Paper proposed that this right be eliminated when works are acquired by digital transmission. Small wonder then that Attorney Morton David Goldberg for the Intellectual Property Owners organization, testified, "IPO does not merely applaud the work that went into the Green Paper. IPO applauds the Green Paper."

A sharp retort was published in The Chronicle for Higher Education by Kenneth Frazier on June 30, 1995:

> Publishers and software producers are seeking an absolute monopoly on the rights to digitize, store, and transmit copyrighted information. Once in complete control of the rights to electronic information, they intend to offer licenses and contracts that will define the extent to which information users may (or may not) read, browse, print, copy, share, lend or retransmit copyrighted works.

The Working Group evidently listened to these expressions of alarm as they evolved the "NII White Paper" which was finally released on September 5, 1995. This follow-up to the Green Paper, Intellectual Property and the National Information Infrastructure, no longer contains a proposal to abolish the "first sale" doctrine and uses language that affirms the concept of fair use and special exemptions for libraries, including interlibrary loaning via transmission.

> While it is clear that Section 108 does not authorize unlimited reproduction of copies in digital form, it is equally clear that Section 108(g)(2) permits "borrowing" in electronic form for interlibrary loan in the NII environment, so long as such "borrowing" does not lead to "systematic" copying (89).

What's more, the White Paper also recommends that libraries be allowed to make three copies, not just one, of works in a digital format so long as only one of those copies is in circulation while the other two are archived. And it recommends the law be revised to allow for the creation of works for visually impaired students (enlarged text or Braille) so long as the copyright owner has not already produced such works (226).

This had to be heartening news to the American Library Association which responded to the release of the White Paper on September 8, 1995, but its position also included this cautionary language:

> Both the White Paper and the agencies responsible for it appear almost totally focused on the information infrastructure's commercial potential. ALA has argued, and will continue to do so, that the information infrastructure can and should be used to expand markets, but that such expansion must be accompanied by the expansion of equitable public access... ALA rejects the notion... that the protection of copyright owners is the basis of copyright law. Rather, libraries contend, the law is based on a presumption in favor of the wide dissemination of ideas at the core of the First Amendment and the intellectual property clause of the Constitution (ALAWON, Volume 4, Number 80, September 8, 1995).

It's important to point out that the White Paper argues forcefully that the driving force for the establishment of the NII will be the content that flows through it, not the technology. And it asserts that only by the protection of the content owner's rights will there be an incentive for creativity that will spur the production of still more content, a position which is fundamentally core to that of publisher's groups, and contested by the ALA. The tension still exists, although there have been still more new developments to ameliorate some of that conflict.

On September 21, 1995, the Consortium of College & University Media Centers (CCUMC) and the PBS Adult Learning Satellite Service jointly sponsored and presented the "Multimedia Fair Use Guidelines" teleconference which was received by a reported 600 sites across the United States. These proposed draft guidelines go a long way toward achieving a middle ground between copyright owners and the academic world over the use of works in multimedia products that are certain to become a component of distance learning. Although there are still a few wrinkles to iron out, and plenty of lively debate to come, these guidelines may very well become as historic as the Kastenmeier Guidelines for Off-Air Videotaping. A cursory summary would not sufficiently elucidate the content of these proposed guidelines, and is not intended to substitute for a thorough reading, but a core idea can be derived as follows. Both students and instructors would be able to use small portions of lawfully acquired copyrighted works to incorporate into the creation of multimedia products for teaching and presentation purposes. These products could also be performed or displayed by instructors in "peer conferences," and be held for two years, after which permission must be sought to retain the materials. And, in a nod to distance learning, there is also a provision for "Remote Instruction":

> Educators may use portions of lawfully acquired copyrighted works in producing their own multimedia educational programs to be used for curriculum-based instructional activities provided over an educational institution's electronic network, provided there are technological limitations on access to the network programs (such as a password or PIN) and on the total number of students enrolled.

This language represents the input of the Instructional Telecommunications Council, affiliated with the American Association of Community Colleges, which

has sought to liberalize policies to allow transmissions in distance learning situations. The ITC's executive director, Chris Dalziel, in a spring, 1995, newsletter, echoed the argument that current law was outdated and impinged on distance educators' efforts to perform, "particularly by video," any audio-visual works, non-dramatic literary or musical works, and that efforts to gain permission are costly and time-consuming. Her group recommended a redefinition of "non-profit educational instruction" under Section 107 (fair use), to include "teaching at a distance to students through the use of telecommunications technologies to transmit and receive voice, video and data." This recommendation did not make it into the Multimedia

Fair Use Guidelines, but the ITC's other recommendation did: The ITC had suggested that transmission be directed "wherever the student is located as long as the student is formally registered for the course" and
provided the transmission was embodied in a closed system. Dalziel said in a telephone interview on October 5, 1995, that the provisions for "Remote Instruction" reflect the ITC's recommendations. While a more sweeping provision to allow broadcasts of educational copyrighted works to students, even though capable of being received by the general public, would have been preferred, "it was one of the things we had to give some on," Dalziel said.

Copyright Protection

It's important to mention that the White Paper by the Working Group on Intellectual Property Rights also recommends certain technological protection methods to ensure that copyrighted works are safely kept from piracy. These methods include encryption, digital signatures, on-line copyright management systems, "electronic contracts" and others. The intention is to provide a uniform means of identifying the author or creator of a work, authenticate the contents, secure transmission, identify the purchaser of the work, and otherwise efficiently and securely manage copyright information in a digitized environment. It is contended that only by use of technological protection methods will content move on the NII: "Copyright owners will not use the NII... unless they can be assured of strict security to protect against piracy (196)." To this end, the White Paper proposes changes in federal law that would outlaw the use of devices, equipment, or methodologies that are designed to defeat or circumvent technological protection methods. And it includes a proposed companion measure to require truth in reporting copyright information digitally, with criminal sanctions against the removal or alteration of digital copyright information. These recommendations are now embodied in "The NII Copyright Protection Act" introduced in both the House (H.R. 2441) and Senate (S. 1284) in late September, 1995.

The debate over policies to accommodate intellectual property and the digital age has clearly matured greatly over the last few months, and all constituencies seem to be on the verge of adopting compromises to balance the needs of publishers, educators, libraries, and the public. However, for the stepchild of intellectual property law in this decade, distance education, progress toward making works accessible to students appears to be moving forward at a snail's pace. It is to this issue we now turn.

RECOMMENDATIONS

That copyrighted works can and should be used in distance education as effortlessly as they can be used in the classroom is an issue of fairness, of "fair use" in copyright and of equitability in general. Students in distance learning are entitled to the same richness and variety found in audio-visual works as their peers enjoy in "traditional" education. But under current law, media specialists and educators must jump through hoops to win permission to use materials that would probably never enjoy any kind of audience except an academic one. People will shell out five dollars a ticket or more to see Sylvester Stallone or Sharon Stone, but they are unlikely to attend the performance of, shall we say, a film on "photosynthesis" even if it's free. So how is it a transgression to present a non-dramatic, educational AV film in a distance learning environment? Not only are audio-visual works proscribed by existing Copyright law, all other non-dramatic, literary forms of expression are barred from transmission if received by the general public (Section 110).

Finalize and adopt the Multimedia Fair Use Guidelines

There is observable progress toward leveling the playing field for distance learning in the proposed Multimedia Fair Use Guidelines. The recommendation for "remote instruction" that allows for works to be encoded and transmitted to students if they have a password or PIN is a step in the right direction; and it is certainly consistent with the use of encryption technologies advocated by the NII White Paper. Therefore, what if a community college scrambled a picture, just as is done for premium cable channels and "pay-per-view" programs, so that it would be accessible only by students who own a set-top converter/decoder? Would this be allowed under the proposed guidelines? Chris Dalziel, ITC executive director, says "In my view it would and according to the guidelines it would because it would be only accessible to the student." Whether or not this interpretation is accepted begrudgingly or not by publishers and other copyright owners, the Multimedia Fair Use Guidelines must be finalized and "signed off" by all constituencies. And to avoid direct conflict with the Copyright Act of 1976, certain sections of the law should be fine-tuned to allow transmissions over a system which is closed by encryption technologies. Section 110 in particular, could use a face lift to explicitly acknowledge that use of encryption (scrambling) is a legitimate method to allow for the transmission of not only "non-dramatic, literary" works, but audio-visual works as well.

Encourage experimentation on a limited scale

Some community colleges, universities, and other institutions of higher learning have more limited financial resources than others due to such factors as a tax base which is down because of a regionally depressed economy. Such institutions may not be able to afford expensive encryption technologies to protect their transmissions, nor may students be able to afford the set-top converters that would unscramble the picture. There are, however, certain less expensive technological measures which could be tried to protect works from piracy. In defined geographical areas such as rural settings, experimentation with these measures should be encouraged along with an accountable method of evaluation to determine "what works." A couple of examples follow.

It may be observed from watching premium channels that, during subscription drives when free programming is cablecast, the top box office movie is "windowed" inside of a picture and bordered by promotional information.

During HBO's recent push for subscribers, popular motion pictures such as "True Lies" and "TimeCop" were shown in windows that were barely half the size of the television screen. The remaining spaces were occupied by text including HBO's toll free number to call in order to get a subscription. If this isn't obvious it ought to be: The purpose for "windowing" the movie is to make it impossible for the viewer to tape the program and pirate it.. I would advocate that if HBO can do it with Arnold Schwarzenegger and Jean-Claude van Damme, then XYZ Community College should be able to do it with Professor John or Jane Doe. Even if an educational film such as "Artists in Wonderland" (Films for the Humanities & Sciences) were to be broadcast in full-size on a local cable access channel, it would be doubtful that anyone other than an art appreciation student would watch it. Putting it in a window surrounded by text information would make piracy a moot concern. The switching devices that make windowing possible are low-priced and relatively affordable for the budget-minded college.

Institutions of higher learning could also use another technique used by networks and "superstations" to identify the source of the programming: a small logo at the bottom right corner of the screen. The viewer would know that the program is coming from XYZ Community College because the logo: "XYZ" appears translucently in the corner of the screen. And viewers who would tape and try to pirate the program may find it difficult to do so because the logo would tip off other users that the program was copied illegally. Perhaps the logo should be a more blatant warning: During transmission, put a small message at the bottom of the screen which warns against illegal duplication, or symbolize the warning with a small "D" that has a circle slash drawn over it. This would put the onus on the viewer who perhaps would tape it for "timeshifting" purposes allowed by the Supreme Court, but not use it outside of the home. And if the film were shown outside the home, in a classroom for instance, then the user could be "caught" by an observant student and be exposed to infringement penalties. It would be interesting to see how often that would happen; probably not very frequently, if at all.

Distinguish between "dramatic" and "non-dramatic audio-visual works"

No such distinction is drawn in the Copyright Act of 1976. Legally, a Tom Hanks movie is treated equally in comparison to a film about "photosynthesis." It would be relatively easy to devise a policy that would forbid the use of a dramatic film released theatrically; but allow the transmission of an educational video purchased by a non-profit educational institution. Granted, films (such as "The Civil War" by Ken Burns) aired by public television stations and networks might not qualify for such an exemption. Nevertheless, if the film was not created for public broadcast, but instead for face-to-face teaching purposes, that's the type of film that can and should qualify for teaching applications that go beyond the classroom.

Educate the educational community about copyright

This is a major recommendation of the NII White Paper. The Working Group on Intellectual Property Rights advocates the position that all of us have the responsibility to become more aware of intellectual property (201-203). It is asserted that "intellectual property" needs to become a "household word." Whether or not this is feasible or fantastic pie-in-the-sky dreaming when not even lawyers and courts can agree uniformly on "fair use" issues is a topic beyond the reach of this paper. But clearly, we could all do a better job of learning and understanding copyright fundamentals. It is a sad testimonial to the

educational profession, and a contributing stressor to the tense relations between academe and copyright owners, that so little of us understand or even acknowledge the importance of copyright. In a 1994 survey of media specialists at 200 colleges and universities conducted by the Association for Educational Communications and Technology, only 15% of 144 respondents answered correctly three fourths of the questions put to them about copyright (Wertz, Chase). It is a small wonder then that copyright owners wants to pull in the reins of fair use and keep them tight, at a price, to higher education. We all need to get our act together if we expect to reap the many benefits the digital revolution makes available to us at the lowest price possible.

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In addition, several works were consulted which appear on web pages for various universities. Being a "newbie," I neglected to note the URL's. Nevertheless, the titles appear below:

"Additional Considerations and Clarifications in the Use of Copyrighted Materials" Office of Media Services & Moffitt Media Resources Center, University of California at Berkeley (internet, 6/95).

-- "Copyright Guidelines and Fair Use" University of New Mexico, circa 1995

-- "Frequently Asked Film and Video Copyright Questions" Office of Media Services and Moffitt Media Resources Center, University of California at Berkeley. (internet, 6/95).

-- "Guidelines for the Use of Films, Videotapes, Filmstrips, Overhead Transparencies, and Slide Programs" Office of Media Services & Moffitt Media Resources Center, University of California at Berkeley. (Internet, 6/95)

-- "Guidelines for the Use of Copyrighted Materials" Office of Media Services & Moffitt Media Resources Center, University of California at Berkeley. (Internet, 6/95)

-- "Video, Audio and Radio" University of Texas System (via html)

-- "Using Materials obtained from the Internet: What are the Rules; Performance Rights in the Electronic Environment" University of Texas system, via html.

A STRUCTURED APPROACH TO HOMEPAGE DESIGN

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ABSTRACT

The World Wide Web is one of the Internet's greatest areas of growth. People who hardly used the Internet a year ago are now making their own homepages. With no standards governing their creation, a variety of formats are being used for homepages. Some are well organized, present their information clearly and work with multiple browsers. Others, however, are slow to load, function poorly with some Web browsing software and are so badly structured that they are very difficult to read.

This paper is intended for beginning homepage authors and for experienced HTML writers who are interested in new ways to organize information. The authors use a structured programming approach to offer general guidelines for creating WWW sites, with an emphasis both on the clear presentation of information and on HTML source code which is easy understand and allows for future changes.

The paper contains a discussion of "structured" HTML, as well as overall suggestions for homepage design. A list of general guidelines for homepage construction is included. Other topics covered include the planning process for homepages, an overview of Web browsers and using graphics in a homepage.

INTRODUCTION

The concept of structured programming offers a model which can readily be applied to homepage design. The model offers a consistent method of Web page organization which can be used in almost any type of Web site to make the homepage more functional and easier to use. It also makes the homepage easier to update or modify, especially if the changes are made by someone who was not the creator of the homepage.

STRUCTURED PROGRAMMING

Structured programming is not a new concept at all. Popularized in the 1970's, it was used to impose a structure on unstructured programming languages such as FORTRAN, COBOL and BASIC. In his 1978 A Structured Approach to General BASIC, George Ledin identified some general guidelines for structured programming:

1) Understand the problem; then break it down into smaller (and possibly simpler) subproblems.

2) Choose program structures that can be applied to each subproblem.

3) Plan your program's information entry (input) and display (output).

4) Do all the necessary bookkeeping (DIMension your array variables, supply the program with explanatory REMarks, and do not neglect the END statement.)

Ledin's guidelines can be paraphrased for HTML writers in the following manner:

1) Evaluate the information being presented and divide it into smaller pieces (pages). Follow "natural" divisions wherever possible.

2) Select HTML commands to use with each piece of information.

3) Decide on the homepage's input (clickable text, images, forms, etc.) and output (how information will be displayed).

4) Perform housekeeping (check with multiple browsers for appearance/functionality, add descriptive, non-displaying comments within the source code, check information for completeness and correctness, test all links).

Structured programming was designed for data processing, not for hypertext. For this reason, this model makes use of structured programming's organizational and documentation concepts but violates one of its cardinal rules: the ban on branching. Ideally, structured programs and their modular subroutines follow a linear model. Each module of code has one entry point and one exit point. This makes sense when programming in BASIC or FORTRAN, as the careless use of GOTO and other branching commands can lead to problems in debugging and updating code, but it is in opposition to one of the greatest strengths of HTML: the ability to set up links to other documents wherever they are needed.

ORGANIZATIONAL CONSIDERATIONS

One of the basic concepts of structured programming is that a problem is broken down into a series of smaller problems, which are then tackled individually. Separate problems are often partitioned off into subroutines, making the program easier to debug and modify for both the programmer and for anyone who has to work on it at a later date. Flowcharting and other visual approaches are often used to help organize a program, frequently before a single line of code is written.

This modular approach is easily applicable to HTML. Where a program is used to solve a problem, a homepage is used to present a collection of information. Instead of subroutines, links to secondary pages are created, each with its own category of information. A modification of the practice of flowcharting is used to assist the creator in keeping track of the information being presented.

Rather than breaking a problem down into smaller problems, an HTML author looks for ways of dividing the collection of information to be presented. The key is to try to use "natural" divisions in the information, rather than trying to impose an artificial system of organization on the information. For example, a computer science professor is creating a homepage. She decides to break it into the following categories: research, teaching, and service. Under research, she includes some descriptions of her research interests, including the full text of

several of her recent journal articles and a complete bibliography of her work dating back to her dissertation. Under teaching, she lists the two courses she is teaching this semester, along with her schedule, office hours, and full text copies of some old tests. Under service, she lists the department, college and university committees she is currently serving on, the professional organizations she belongs to, information on the conferences she recently attended as well as the complete text of the papers she presented there. These divisions are fairly logical, and someone visiting her homepage would probably find the information they were looking for with little trouble.

Systems for the artificial organization of information have their applications in the real world, but they offer little or no advantage in structuring a homepage. For example, many large academic libraries use the Library of Congress call number system to organize their holdings. The LC system is well suited to organizing large collections of books and other works, but it is difficult to use for anyone who is not familiar with it. The professor in the example above could have put everything in her homepage in order by LC call numbers, but in doing so she would have made the information more difficult to find.

Flowcharting

Flowcharting in the realm of programming often involves laying out the sequence of tasks a program is to carry out, showing inputs, decision points, subroutines, outputs and other processes. Flowcharting can easily be adapted to HTML authoring and is extremely helpful in homepage organization. It is especially useful in creating consistency between the various pages within a homepage.

Single sheets of paper -- either letter- or legal-sized -- can be used to represent each page of the homepage. The process can be as simple or as complex as the designer wishes. At its most basic level, such a flowchart would show links to other pages and the information inputs (forms, links allowing comments, etc.) and outputs (display). Flowcharts can also show the page in detail, with notations for highlighted text, justification, graphics, and other elements which will affect how the homepage appears to the users. Homepage flowcharts can also contain notes on the locations of files, the URLs of the links and other structural information. Some experienced homepage designers lay out the entire homepage on paper before beginning to work on the HTML code. Although it may seem time-consuming, flowcharting can save a great deal of time in the long run by helping the designer decide how the information will be presented.

First Page

A structured program often has a "core" section of code which deals with the problem to be solved in a sequential fashion. Decisions within the program are sent to subroutines. The subroutines are often located at the bottom of the list of code, thus leaving the core code intact and easy to read and modify. The HTML counterpart to this concept is the use of a primary file (usually named *index.html*) for the first page of the homepage. This page is used mainly as a link to the other parts of the homepage. Keeping this page as
simple as possible not only makes later modifications to the homepage easier, but it also means that the first page of the homepage does not change in outward appearance when the rest of the homepage is updated. The length of the first page should ideally be one to two "screens." Longer, more detailed pages should be linked to, not placed where everyone is forced to wade through them.

Considerations regarding graphics are discussed in detail later in this paper, but the size and number of graphics should be minimized on the first page of a homepage. Inclusion of large images or large numbers of images can slow down the loading of the first page. Avoid following the lead of those who have reduced their first page to a single, clickable icon or graphic which leads to the real homepage. Such an affectation merely slows access for those who are trying to reach the homepage and is especially annoying to repeat visitors.

The first page of the homepage is also the repository for information which is likely to be needed by the majority of visitors to the homepage. In this model, the following pieces of information are suggested.

- Name of the person, department or organization represented by the homepage. A surprising number of homepages do not give this information.
- If the purpose of the homepage is not clear from the title, a brief, appealing text introduction can be added.
- Links to other parts of the homepage, divided into broad subject categories as described above.
- "Snail mail" (U.S. Postal Service) address. Optional on personal homepages, this should be seen as absolutely essential for businesses and other organizations.
- Phone (voice) and fax number(s). As with mailing addresses, this is optional for personal homepages.
- A clickable e-mail address which allows users of the homepage to ask questions or send comments.
- Date of last update.

Evaluating Homepage Organization

The only way to really test if a homepage is well organized is to have someone else examine it. Having several other people preview it -- especially people with different interests and educational background -- is a good means of finding out if the page will be usable for the Internet community. Some stumbling blocks to watch out for include:

- Acronyms, jargon, and other subject specific terms are confusing to those outside a narrow field of interest or from a different region or country.
- All links should be clearly identified. Many HTML writers make the mistake of marking a link with only a word or two, such as "More" or "Bill's Page."

- Identifying each page within one's homepage with a notation or small icon or logo at the top is optional but useful, as it tells users when a link has taken them to another system. It helps in avoiding complaints or comments which should have gone to the owner of a different homepage.

DOCUMENTATION

Page Titles

Titles for the first and subsequent pages within a homepage can be seen as documentation to help the user. Meaningful page titles are a great asset in a homepage, especially now with the large number of WWW search programs available. The main title of the homepage should be as descriptive as possible. When a Web search results in a list of homepage titles and text excerpts, the titles will be the first indication the searcher has as to the contents of the homepage(s) found by the search.

The name of the department, organization or business is a logical choice for a title, as is the name of the individual in the case of a personal homepage. Another alternative for a name is the purpose of the homepage, such as "Mail Order Books" for the homepage of a mail order bookseller. On the other hand, it is counterproductive to use an unrelated or misleading title, such as an acronym instead of a company or organization name. If the homepage is retrieved as part of a WWW search, a name that does not seem to relate to the subject being sought is likely to be bypassed by the searcher in favor of more promising names.

Documenting Source Code

A common practice in most programming is that of placing comments within the source code. These comments may provide explanation of different sections or modules within the program, notes on the organization of the program, information about the writer(s) of the code, date of last update, etc. Comments are good programming practice, and they are also extremely useful in the HTML environment.

Not frequently used in HTML, comments can be added with the following command:

<!-- *text of comment* -->

Comments cannot overlap or nest, but they can cover more than one line. Some browsers, however, may not handle a multiple line comment, so it is best to use a separate command for every line of comments. The comment command should only be used with text. Although it can be used to hide HTML commands from some browsers, this does not work with Netscape.

Comments within the source code may repeat or augment formal, written documentation. The advantage of these comments is that they can be placed directly adjacent to the code they are meant to explain. Additionally, printed documentation can be misplaced and is unavailable to outside users who may look at a Web site and display the source code to see how something was written. Comments in this context can make the HTML code much easier to understand at first glance. Another consideration is that a homepage may have

to be updated or modified by someone other than the creator. Even the original writer may have difficulties deciphering parts of the source code after some time has passed.

TEXT

Most of the actual information presented on a homepage will be text. There are several easy ways to make this text more readable and understandable. Keep the amount of text on introductory pages to a minimum. Conciseness will make the important parts easier for the user to find. For example, the first page might simply have 3 or 4 choices, each of which leads to a more detailed menu of choices, rather than listing all the items in the menus on one page. A small number of logically arranged items, leading to more detailed menus, will help users find the information they want. A menu format, with a list of headings from which to choose, is preferable to including clickable words in paragraphs of text. Reading through paragraphs of text to find the correct entry takes time and effort and is confusing.

The headings (type size) variations of HTML should be used to make the hierarchy of text on the homepage clear. These heading sizes vary from H1 to H6, with H1 being the largest. The main page heading might be in H2 size, the first level subheadings in H3, the second level subheadings in H4, and any other text in unmodified standard size. Keep in mind that users will see slightly different displays of your pages depending on their browser, but use of headings variations enables the homepage writer to specify changes in type size regardless.

Large text files of various sorts can be made available through a homepage. These could include items such as the annual report of an organization, the full text of articles or research reports, or policy and procedure manuals. The ability to access this information remotely via the Web can be very useful. However, these files should be clearly marked so that users know what they are. On the menu from which the user will access them, the size of each file in K should be listed. It should not be necessary for the user to scan through large text files in order to find links to other files. At the bottom of a large file, it is helpful to add buttons to return to the homepage and/or the previous page, to avoid scrolling back through the entire file if reading it online.

GRAPHICS

The ability to display graphics is one of the most exciting aspects of the Web. Graphics can add visual interest and useful information to a homepage. However, overuse or incautious use of graphics can detract from a page's performance or overall appearance. Use of graphics files which are too large can increase loading time of the page to the point where users get impatient and give up, especially repeat users. Graphics files will look different on different monitors and with different browsers, so it is a good idea to preview the appearance of your page on several to check for variations. Files of
electronic clip art, including buttons, lines, and icons, are available for downloading through the Web or various ftp sites. These small files can be used to add visual interest to pages without using excessive disk space or loading time. The GIF graphic format is the only one readable by all current browsing software. If you have images in other formats, such as BMP (Windows bitmap) or JPG, a converter program can be used to change them to the GIF format.

Consistency and standardization of graphic content is important. A logo or other similar standardized feature will help the users know when they leave a certain web site's area and link to others. For example, a university might place a small graphic of the university's official logo at the top of each web page. Other graphics can also be standardized. A set of icons for such functions as Home (return to home page), Comments (leave e-mail comments), and Back (return to previous page in the hierarchy) can be created and used on all pages at a particular site. Standardization of other graphics such as buttons, lines, and bars adds unity to a site's pages. A template can be created for use by HTML writers at a particular web site, specifying which graphic images should be used on their pages. A graphics subdirectory can be created on the server as well, so that only one copy of these standardized items needs to be loaded on the server and all pages can link to it, rather than copying it into each page's individual directory. With this method, if a standard graphic is changed or replaced, it need only be done in one place instead of dozens.

Choice of the type of graphic to use is vital. Photographs, while easy to obtain and scan into computer-readable form, do not display well through some browsers and on some monitors. Photo processing software may help clear up some of the problems, by reducing the total number of colors needed for the image and allowing editing of the actual image. However, line drawings are generally smaller size files, require less time to load when viewing the page, and display better. Line drawing of buildings or people can be used instead of photos. If photos are chosen, they should be cropped to remove extraneous information. They may also be reduced in size.

Large image files can take time to load and view. While it is a good idea to avoid overly large graphics files when possible, they are sometimes desirable or necessary. One way to make large images available but avoid forcing all users to spend the time necessary to load them is to use thumbnail graphics. A much smaller copy of the desired image is made. This copy is displayed on the home page, is made clickable, and linked to a separate page which contains the full larger image. This allows only those who are interested to take the time to view the entire image.

Imagemaps are another type of graphic which can be used in homepage creation. Imagemaps are graphics in which various areas of the image are clickable and link the user to other HTML documents. An imagemap with various clickable buttons can be used instead of a menu list. For instance, a map of the state of New Mexico could be made into an imagemap. The various cities and towns in the state would be clickable, with links leading to information on each. If you clicked on Las Cruces, you would link to a page with more detail about the city. Imagemaps, like other graphics, will not be visible to users accessing the page with a text-based browser, so other provisions need to be made for them to access the same information that the imagemap links to. Some users may be unfamiliar with imagemaps and how they work. The address of the link from each area of the imagemap does not display before it is selected, as it does with text links, and users may not realize that they can click on the various areas of the image. A sentence or two explaining how to use the imagemap will help everyone to make full use of the page.

BEST COPY AVAILABLE

The following guidelines should be considered when using graphics in homepages:

- Don't overuse graphics.
- Use small, appealing, clear images.
- Check how the images appear with different browsers/monitors.
- Standardize graphics for your site.
- Consider using a logo or other identifying image.
- Create a template for graphical appearance of pages at a site

Browsers

Although Netscape is currently the most popular Web browsing software, web developers must remember that users will be viewing their creations with a wide variety of browsing software. These include Lynx, Mosaic, Cello, and MacWeb. Each browser will display information differently. Pages should be tested using at least a couple of these to be sure they work. Some mistakes in writing HTML code will cause errors in Mosaic but be ignored by Netscape, such as forgetting to add quotation marks (") at the end of a link address in an anchor. Many users still have text-based browsers such as Lynx. These users will not be able to view any of the graphic images on your pages. For this reason, any graphics with important contents should have an alternative text file specified. In HTML, this text file is included with the command displaying the graphic. For example, the command <IMG SRC="library.gif" ALT=[picture of library]> would display the image library.gif to a graphical browser or the text [picture of library] to a text browser.

SUMMARY

In conclusion, homepage construction based on structured programming concepts makes it simpler to build a functional homepage. It also assists in organization of the homepage and provides for easier maintenance and modification.

Guidelines for Authoring Structured HTML

- Make a flowchart of the page structure.
- Create a template if desired.
- Select graphics; keep them small and simple.
- Use first page as a gateway with links to the rest of the homepage. First page contains only information that will be useful to most or all users.
- Create subsidiary pages for each category of information presented.

- Assign meaningful titles to homepage and links.
- Test homepage with a variety of users/browsing software/computer hardware.
- Document HTML code with non-displaying comments.

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APPENDIX

WWW sites containing graphics, HTML writing guides, HTML converters, HTML editors, and other helpful information:

- WWW and HTML Developer's JumpStation
  http://oneworld.wa.com/htmldev/devpage/dev-page.html
- W3 and HTML Tools
  http://www.w3.org/hypertext/WWW/Tools/Overview.html
- WWW Repository
  http://cbl.leeds.ac.uk/nikos/doc/repository.html

ACCESS IS OWNERSHIP: THE PEOPLE BECOME THE PUBLIC PRINTER

by: Daniel Barkley and Jackie Shane, University of New Mexico

Keywords: Electronic information; government information; Internet; National Information Infrastructure; Federal Depository Library Program; Government Printing Office; FDLP; NII; GPO.

The Evolution of the Federal Depository Library Program

The United States government has been and continues to be the largest publisher of information in the world. Since the inception of this country's founding in 1789, the Constitution as well as Congress have mandated the collection and dissemination of their records including the Executive and Judicial branches. The intent being that leaders would facilitate the concept of an informed citizenry as a knowledgeable and therefore participatory society.

From 1789 until 1846 provisions were made by Congressional mandate to facilitate the informed citizen process by establishing provisions to print, disseminate, and preserve all matters occurring in Congress. Initially all agencies reported to Congress, hence their publications were included within these guidelines. "While these responsibilities were met for many years through the use of contract printers, such arrangements proved to be subject to considerable political abuse. Consequently, in 1860, Congress established the Government Printing Office (GPO) to produce all of its literature....and to serve, as well, the printing needs of the Executive Branch." [1]

Further printing and publishing policies were centralized with the Printing Act of 1895 which established the Superintendent of Documents (SuDoc) whose duties included the management of selling government publications as well as preparing a *Monthly Catalog of United States Government Publications*. "This act, which was codified as Title 44 of the United States Code (USC), specifically abolished other government distribution programs." [2]

GPO from its inception has been faced with budget constraints. Only two days after monies were authorized for the construction of GPO buildings in 1860, Congress simultaneously reduced the "prices allowed for public printing" by "forty per centum."

Although initially the Superintendent of Documents (SuDoc) was weary of contracting with outside commercial publishers the Legislature eventually understood that GPO would not realistically be able to handle the massive amounts of agency publications. Hence, as provisions were made to publish and distribute agency publications via non-GPO production facilities these documents often evaded the SuDoc Distribution Program. These are commonly known as "fugitive" documents. The Depository Library Act of 1962 delegated GPO as an agent to acquire and distribute these non-GPO publications.[3]

The success of the Federal Depository Library Program (FDLP) has always relied upon the cooperation between GPO and participating libraries. Title 44 United States Code (USC) defines public information as "informational matter which is published as an individual document at government expense or as required by law." Within these guidelines all publications of relevance to the United States citizens are distributed free of charge to Congressionally designated federal depository libraries. These approximately 1,400 federally appointed libraries reciprocate many times over in providing full access to government documents and the supporting infrastructure necessary. [4]

Since the 1980's Federal agencies have increasingly distributed their information in electronic format. During this time period, for example, the Bureau of the Census introduced the agricultural and economic statistics generated from 1982 surveys in Compact Disk, Read Only Memory (CD-ROM) format. These disks were a harbinger in 1987 for electronic dissemination of products and services.

With the advent of electronic information dissemination techniques, legislation has lagged in staying abreast of new technological issues. As more agencies engage in desktop publishing and distribute not print but electronic products, there is less need for them to rely on GPO as a distributing body. [5] Many of these agencies began by publishing their information on floppy diskettes and CD-ROMs, but since the development of the *National Information Infrastructure* (NII), the trend has recently been to mount files directly onto a server attached to the Internet. Due to broad interpretations of Title 44 of the United States Code "many of these products are never distributed through the GPO, and hence never reach depository libraries, often without the knowledge of the participants." [6]

One of the prime responsibilities of the GPO has always been to print the daily proceedings of the legislative, executive, and judicial branches of government. These include the *Congressional Record* (the official daily proceedings of Congress), the *Federal Register*, (a daily compilation of regulations, executive orders and proclamations), and its official codified counterpart, the *Code of Federal Regulations*. By 1985 the daily printing of the *Register* alone totaled nearly 33,000 copies. [7] Considering the voluminous nature of these materials, coupled with the fiscal constraints with which GPO is burdened, these materials are obvious candidates for electronic dissemination via a central gateway.

GPO's initial pilot project to disseminate *the Congressional Record* on CD-ROM was a complete flop. Although the CD format was more economical than a comparable quantity in paper, the total cost to the government for dissemination of the 1985 *Record* was greater than the estimated cost for disseminating the microfiche format. Additionally librarians reported considerable complaints about its usefulness.

In 1993 the *Government Printing Office Electronic Information Access Enhancement Act* (P.L. 103-40) was enacted. Under this new legislation the Superintendent of Documents was required to:

- maintain an electronic directory of Federal information
- provide a system of on-line access to the *Congressional Record*, the *Federal Register* and other appropriate publications and
- operate an electronic storage facility for Federal electronic information

In other words, SuDoc was required to maintain a locator service, an on-line interactive service, and a storage facility.

While federal agencies were in hot pursuit of developing electronic products and services in the 1980's, other legislative, administrative and private sources were hard at work attempting to develop, design, establish, and implement a technical infrastructure which will connect government agencies, the private sector, and

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every individual or household to an electronic highway. This information superhighway, commonly referred to as the "Internet", the mother of all networks, is now viewed as the panacea to all the informational woes of America as well as the World. "...as of November 3, 1993 more than 2 million connected host, 20 thousand NSF registered networks, 127 entities (or nations) with international network connectivity, involving as many as 20 million people capable of sending and receiving data streams of 45 megabits per second," along with about 2,000 universities, colleges and high schools..." are estimated to be connected to and using this information superhighway. [8]

The Internet's evolution began in the 1960's as an electronic network for information transferred between federal agencies, principally the Department of Defense, and their private contractors and university researchers. By the 1980's, with an infusion of funding from the National Science Foundation (NSF), this system developed into a high-speed network of data transmission sites. This structure was enhanced "...by funding the establishment of regional networks to interconnect educational and research organizations and their individual computer networks." [9]

The Dynamics of Technology and Economics

Information Science developed rapidly between the invention of the personal computer (PC) and the development and deregulation of the NII. The PCs of the early 1980's ushered in a new era transforming the methods and means by which information, regardless of source of origination (ie--government, corporate, or private) has been disseminated and utilized. The computing and storage capacities of PC's coupled with telecommunication technology has carried our society into the information age.

Essentially, technology is value neutral. Technology neither prevents nor improves access to information. However, "threats to public access and improved access can both result from the use of technology" [10] as government policies are articulated, planned, enacted, deregulated, or changed due to the political/or economical environment. Additionally, economic market forces also dictate who may gain access to electronic information as well as when and where they may access that information.

While the electronic age is a result of technological achievements of the past decade, the dissemination policies of federal and, to some extent, state government information have had both positive and negative impacts on the users and non-users of information which has been collected, collated and disseminated by those entities. This transition has resulted in "a move from a centralized printing authority (i.e.--the Government Printing Office [GPO]) to one of autonomy and decentralized printing and on-line dissemination" [11] of government information.

In fiscal year 1995 the Library Programs Services (LPS) of the GPO increased by 31% [12] the number of electronic titles distributed through the Federal Depository Library Program (FDLP). Yet, for dissemination of information in traditional formats (i.e.--paper and microfiche) "from 1981
through 1991 more that 514,000 separate publications entered the depository program...a decline of 26.4%." [13] This discrepancy and loss of information is not a direct result of new dissemination technologies and techniques. Rather, it

is a result of fiscally conservative political and economic practices and policies engaged in over the past decade.Conflicting opinions rendered by different GPO General Counsels [14], the enactment of the *Paperwork Reduction Act of 1980* (PL 93-511), and the issuance of the Office of Management and Budget's (OMB) Circular A-130, The Management of Federal Information Resources has confused GPO's ability to disseminate information in non-traditional formats Additionally, GPO witnessed a drastic decrease in operating monies necessary to maintain and increase gathering and disseminating electronic information. [15]

Despite these political and economic constraints, the GPO, SuDoc, and LPS have made good-faith efforts and have re-examined the technical guidelines to ensure that government information continues to be equitably distributed to the American public. LPS, for example, has issued revised minimal technical guidelines for depository libraries vis-a-vis computer hardware and software requirements. GPO continues to seek legislative revisions to Title 44 USC as well as necessary operating funds.

This is not the first time librarians witnessed a transition in format. Years ago, librarians were reticent about using microfiche as a medium. The increase in electronic titles revealed a lack of experience and shortage of accompanying hardware and software. This frustrated even those librarians who were willing to embrace these new resources with open arms.

Many librarians, including those in the FDLP, are still ill prepared to handle information in solely electronic formats. At the most basic level internal library budgets prohibit purchasing the required electronic hardware.

Many libraries posses at least nominal equipment but lack the technical expertise. In a recently released survey which was conducted by the LPS in the Summer of 1994, the "survey revealed that while most depositories have some capacity to handle electronic Government Information, ('94% have a PC'), most libraries have a long way to go before they can serve the public effectively when the FDLP becomes predominately electronic." [16]

Even those libraries possessing the necessary hardware, software, and prerequisite expertise, experience a host of related problems [17]. Not all information being disseminated in an electronic format, especially those in CD-ROM's, are accessible to users of federal depositories for a variety of reasons. This information, which is "technically" available, may be stored under a selective housing agreement and located in a branch library where its staff may lack the equipment/or knowledge necessary to access and disseminate that product. As a result, "vast amounts of Federal information lie dormant on shelves, in cabinets or in desk drawers for lack of administrative support and/or technical capacities and skills to utilize it." [18]

Finally, not all users possess the technical hardware, software, and skills to utilize the information presented to them in the fullest, nor do they care as long as it is electronic in nature and is retrieved from a computer. "There is an apparent tendency for patrons to define information needs in terms of what is easily available from an electronic source....users seem more satisfied with the computer even if their actual search is not particularly successful." [19] On the Internet other issues come to light. A user for example, is rendered helpless if the server client is "down" or tied up by limited band-width.

The Internet as a platform

In conjunction with the reorganization of the FDLP, and the development of information science in general, the NII has evolved from its origins as *the National Education and Research Network.* No discussion of electronic dissemination is complete without examining the Internet. The Internet has been the buzzword of the nineties. It is virtually impossible to browse the popular press without crossing some reference to this most popular network.

The common interface language evolved most recently from *Gopher* to *World Wide Web* browsers such as *Netscape* or *Mosaic.* This coupled with the proliferation of *hypertext mark-up language (html)* editors has created exponential growth in the number of Internet nodes available for searching. A majority of government agencies now use the Internet as a method for distributing their information sources, at least at the experimental level. An agency makes its computer an Internet host, by allowing users at remote locations to log onto the agency computer usually via *Telnet*, and search its database for information. Users can also download files from the server via *FTP* with an anonymous password.

Agencies disseminate and maintain large databases of their information via the Internet because they believe it is more economical, timely and efficient, and fulfills their legal responsibility to provide access to that information to interested citizens. On the one hand the Internet is a relatively efficient platform for distribution; on the other, agencies, as previously addressed, may feel that their obligation for distribution has been met without ever making their equivalent paper publications available through the FDLP. Using the Internet solely as a platform makes this information not only difficult to locate, but there is no guarantee that an agency will not abruptly end Internet availability without notice, or without provisions for alternative distribution.

Unanswered questions

A host of other questions remain unanswered. For example, the archival provisions for CD-ROM's, floppy disks, Internet hosts, and government sponsored/or produced Bulletin Board Services (BBS) remain open to interpretation. Furthermore, who is responsible for the retention of government information? Will future technological developments supersede the usefulness and accessibility of electronic information being produced today? What will be the role of the FDLP should the prediction of some futuristic pundits become true: that budgetary restraints and political policies will finally eliminate the FDLP and the GPO and government information will only be available on the Information Superhighway?

Other problems address the expected performance level of information professionals. Since quite often what depository libraries receive are nothing more than raw data sets [20] or data with no accompanying software or adequate documentation, librarians often feel compelled to provide a "value added" service. Librarians may increasingly focus less on information *access* and more on information *synthesis*. Microdata for example gains tremendous value to the user when it is imported into a statistical manipulation program as opposed to being read simply in the "cross tab" program which is provided free with the

CDs. Information professionals need not only understand the content of information, but in order to access electronic files they will need to be information savvy as well. Who will be responsible for user education and training? Will this challenge eventually be offset by the trend in sophisticated, user-friendly interfaces and centralized gateways?

Privatization and the story of NTIS

Compound the previously mentioned problems facing the GPO and the FDLP today with legislative initiatives that are moving forward with the privatization of government information. These initiatives, prominently introduced during the Reagan Administration continue to hamper and impede information accessibility. For example, the efforts over the past several years at the movement to privatize *the National Technical Information Service* (NTIS) are well documented.

NTIS was established in (1965) to be the nation's primary disseminator of government sponsored scientific and technical information and research. NTIS, one of the first federal agencies established to function on a cost-recovery basis substantially achieved that directive until private market forces, spurred by the burgeoning information industry of the 1980's persuaded the Reagan Administration to sell or "privatize" NTIS.

This proposal was initiated to permit the private sector to obtain the scientific and technical information and repackage that information in order to generate a profit. Had the sale of NTIS become successful an outcome would have been a total disregard to archiving research documents, particularly that research which would be determined to be unsalable or unable to generate a sufficient profit.

As a result of efforts by the Reagan administration to sell NTIS to the private sector, "Congress enacted 'compromise' legislation, which requires much of the agency's activities to be funded through user fees."[21] Because of these private sector demands and Congressional legislative stop gap preventive measures, NTIS must now demand higher than normal prices for its information. Many NTIS products generate little interest or income. Therefore, other areas of research or product services offered by NTIS must compensate for these non-revenue producing studies.

Yet information, regardless of its profitability, is still available to any interested parties. Had the private sector forces had their way, only reports and other services which demonstrated any potential for profit would now be available or accessible. Furthermore, it is difficult to estimate whether or not prices charged today by NTIS would be less, more, or the same as what the private sector might be charging.

Still, the battle over privatization of NTIS continues today. Legislation which would disband the Commerce Department, which has oversight for the administration of NTIS, has been recently introduced. H.R. 1756 not only proposes privatizing NTIS, but also mandates that all NTIS assets be sold. These "assets" are the more than 2.5 million government sponsored research and development reports currently available from NTIS.

Although H.R. 1756 has been referred to numerous committees for hearings, as well as for further markup and compromise, this attempt at privatizing NTIS is

just the tip of the iceberg with respect to the efforts of both a fiscally conservative Congress, coupled with an opportunistic and profit driven private sector. Other efforts of privatizing government operations have already occurred (for example, the Postal Service, Amtrak, etc.). Should these efforts by the private sector and Congress continue unabated, the next area designated could be the GPO or other agencies now producing information sponsored by tax payer dollars. What this essentially means is that information, generated by funds collected though the assessment of taxes, would be packaged and resold to the highest bidder or those most able to afford to purchase that information.

However, how can the FDLP fulfill its mandated legislative mission if more and more information becomes privatized while at the same time GPO's budget continues to decline? Privatization furthers the schism between these participants and impedes the government's ideal goal of bridging these economic gaps which now exist. Further, privatization contributes significantly to the lack of participation by the American public rather than enhancing and fostering the ideal of more participation because of a better informed and more knowledgeable public.

The haves versus the have nots

These privatization efforts lead us into another major problem area facing information professionals today: the haves vs. the have-nots. There has existed in this country since its founding an inequality in social status, wealth, and material ownership. At this juncture it is impossible to address these societal issues adequately. Libraries, even prior to the establishment of the FDLP, have historically served as gatekeepers of information for everyone, regardless of social or economic status.

The vast array of commercial on-line service providers expanded the number of *World Wide Web* users to somewhere between 2 to 13.5 million people according to an American Demographics magazine survey. [22] This is still however, a vast minority of the population.

As the Clinton/Gore team and Newt Gingrich furiously uploaded their home pages, there was a sense that the Internet was providing U.S. citizens a new world cyber-democracy. Environmentalists and gun advocates alike can recruit their constituents via email, bulletin boards or listserv announcements, and directly send feedback to Washington on pending bills. Democracy is at the fingertips of the populace. We would need however to disregard that latest published statistic which shows that 3.7 percent of all adult Americans own a computer and are connected to the Internet at all, and of that selection, the majority of these users are men who earn $25,000 to 75,000 a year. [23]

Furthermore we would have to disregard the fact that anyone can send a message under an alias name and address, and that politicians would have no way of knowing whether these notes actually originated from legitimate constituents. A note could represent an individual, or a bulk mailing might bombard a legislator's email box. Certainly, sending an email to Congress is much more efficient than a long distance phone call or the post, and the beauty of going on-line is that it is fast and potentially interactive. There remain several bottlenecks to a "seamless" electronic environment.

This leads to a concern for the disparity between the information "haves" and the "have nots." If access is ownership, than information access must be ubiquitous. Depository libraries must continue to provide free, unrestricted access to all public documents regardless of the medium, so that format is negligible. The information rich will always exist. What is important is that depository libraries serve as a safety net for the "have nots."

Even if all depository libraries are connected to the Internet and are fully equipped with electronic hardware, and as long as agencies are in compliance with Title 44, there is an underlying assumption that access to this information is not diminished. Whereas residents of rural communities had to go farther than their urban counterparts to find a print copy in a library, similarly they will still have to travel the distance. They should technically be guaranteed a copy, even if now it is via an electronic node. As the book was on the shelf, the copy is on the monitor. If a depository library loses its status because it can not afford to meet the recommended minimum guidelines for hardware as stated by SuDoc, then a large geographic area will no longer be served.

Implications for the future

Electronic delivery currently has no central point of delivery nor catalog. Perhaps the biggest challenge is distinguishing and locating the various formats in which government information is distributed. Locating government information has traditionally been perplexing, but the variation in formats from CD-ROM, magnetic tapes of machine-readable files, dial-up services and bulletin boards, floppy disks, *Geographic Information Systems* (GIS), spreadsheet and relational database files, and (on the Internet) registered databases, public Gopher and Web sites, and FTP-able archives can certainly glaze the eyes of the average user. Often catalogs and search engines are either experimental or non-existent. A prototype locator system was developed with descriptive electronic records for government information products available from GPO sources. In addition *the Government Information Locator Service* (GILS) provides a central registry of information resources from other Federal agencies, and serves as a gateway to those resources. As part of the Federal role in the NII, GILS identifies and describes information resources throughout the Federal government, and provides assistance in physically obtaining the information. GILS employs a client-server architecture based on the ANSI Z39.50 protocol (the information retrieval service definitions and protocol specification for library applications). The logic is that the Z39.50 client/server search protocol is already supported by billions of dollars worth of bibliographic catalogs. It is also the protocol required for use by all U.S. Federal government agencies, under public law Title 44 USC 3511 which established GILS in the first place. GILS was developed with the intent of using World Wide Web client searching (support for searching via the WAIS protocol, to date, is still in the development stage). *The United States Geological Survey* announced the alpha release of the freeware software the day that this article went to press. For further information see url:**http://www.usgs.gov/gils**.

Indeed there is a role for the Government Printing Office to help maintain consistent and equitable service standards. GILS demonstrates great promise in maintaining a standard protocol for bibliographic control of on-line government information. If access is ownership, there needs to be one consistent gateway

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from which one can reliably index and access publications, regardless of their format or location. Not only must this be a mandatory requirement assigned to government agencies, including agency desktop publishers, but information professionals should exploit these search strategies. Again the key is equipment and user education.

Depositories must prepare to offer users access to work stations with a choice of text based or graphical user interface, CD-ROM capability, Internet connections, and the ability to print or download electronically. By 1996 or 1997 electronic capability will be a requirement for depository status. [24] Those libraries who cannot provide adequate hardware will simply be out of the loop. The question remains as to whether some administrative authority will provide funding for those libraries who "have not." If a rural library, for example, cannot afford the necessary equipment, that "safety net" has then been erased for a large geographic region. Ironically as our national treasure of information becomes global, our own home towns run the risk of losing access.

Resolution

The most complex and costly era is in the present. Eventually all information professionals will speak the vocabulary needed to understand electronic delivery. In this age of transition however, user groups vary tremendously in computer literacy and hardware. As a result, there will inevitably need to be duplication which will impact LPS's budget, and will, of course, impact libraries as they need to provide access in multiple formats. There is a need to reliably maintain electronic information for continuing public access should the originating agency no longer make it available. We will see more collaborative efforts between GPO and individual libraries.

The literature tends to discuss large policy issues and not the more mundane realities. Information professionals need to give policy makers and GPO feedback. It is not enough to erect a Web page. Providers need to understand that on the receiving end there are simple everyday barriers to access. If distributed servers are the answer, someone needs to assign responsibility. Those enlisted individuals or institutions deserve to be compensated for their added expenses. It is unfair to assume that libraries will absorb the cost of what taxpayers are already paying for--namely the
coordinated publishing of government information.

Finally, the Internet is a potential for open forums and cooperation. Government agencies and policy makers must find a common ground for communication between the information providers and the users of information. The Internet holds tremendous potential for shared information networks. Likewise it is a platform for public policy issues forums.

Implications for the state of New Mexico

As has been aptly illustrated above, the same problems facing the Nation extend into the state of New Mexico (and the other 49 states as well). These problems are further exacerbated by New Mexico's low ranking in population, medium income, educational attainment, and those living on or below the poverty line. [25] Additionally, New Mexico is still primarily a rural state with only two

large metropolitan areas which are closely located to one another, and which contain the majority of the state's population, libraries, economic and business centers and its State government. [26] The rural areas which are sparsely inhabited are disconnected from the state and world because of great distances, lack of telecommunication lines, and access to computers.

Despite these disparities in population, income and education, various local, state, and federal agencies have combined their talents and limited economic resources to facilitate the development and maintenance of networking capabilities to aid in the State's hurried approach to participating in the electronic age. Furthermore, the State has two Regional and eight selective depositories that not only contain rich collections in historical information, [27] but are also actively participating in the FDLP's and the NII's efforts to provide electronic information to the culturally rich and diverse populations in the State.

Currently, several projects are in various stages of implementation and development which has afforded the State's population the ability to participate in civil matters as well as in obtaining personal information and knowledge. These projects are enhancing those who don't have access capabilities the ability to link to the remainder of the World via the Internet and participate in the "global village" in which this society is quickly moving.

The first of these projects was developed through a consortium of State universities (the University of New Mexico, the New Mexico State University, and the New Mexico Institute of Mining and Technology) along with the assistance of the major State research organizations, (the National Laboratories, Sandia and Los Alamos labs, White Sands, etc.) and with the State of New Mexico government. New Mexico *Technet* (Technet) is a private, not-for-profit corporation that has been in existence for over 10 years.

Technet provides Internet access throughout the state of New Mexico as well as connecting the Navajo Nation which incorporates areas of New Mexico, Utah, Arizona, and Colorado. Technet provides Internet access through a 10Mb connection via the Advanced Network Services whose core node is located in Albuquerque. Technet also utilizes a T1 connection as a backup which is based at the New Mexico State University in Las Cruces.

Currently Technet has over forty nodes in various locations state wide and also provides over thirty nodes located in K-12 schools as well as to private companies. Many of the private concerns are government contractors whose primary business contracts are with local, state or federal agencies.

Those connected purchase a point-to-point bandwidth to Technet nodes which connects them to databases at those nodes, or, utilizing a modem, a connection to the Internet. Technet also provides Internet access to local Internet re-sellers (i.e.--*Route 66* based in Albuquerque). Funding for Technet comes from the NSF and WESTNET which help offset costs involved for the T1 backup connection. All revenues generated are returned to Technet to offset operating and maintenance expenses and for the expansion of the network.

The Crown Point Project, only a year into its initial implementation, was developed through the efforts and hard work of State Senator Leonard Tsosie along with the cooperative efforts of Los Alamos National Laboratory, the

Navajo Community College, Crownpoint Institute of Technology, the Bureau of Indian Affairs, the Indian Health Services, the Department of Energy, and a host of other federal and state agencies, and state universities.

The project envisions linking the Navajo Nation through a series of Wide Area Networks (WAN) to the Intenet, as well as other local, state, and federal networks and BBS's. Access will enhance and improve the Navajo Nation's ability to provide better and much needed health care and educational training as well as better economic opportunities to a significant and specialized population (about 200,000) whose area of habitation spans over 25,000 square miles. At the same time, this project is being designed to not interfere, but rather preserve Navajo traditions.

This project, upon successful implementation , will serve as a model for Native and non-Native American communities by demonstrating how to combine and utilize financial and technical resources provided by federal, state, and private entities. This project, initially located at the Crownpoint Institute of Technology will not only provide high speed data connections, but also will provide training in the installation, maintenance and operations of these technologies required for such a network. By providing this training, the plan is to help open doors for Native Americans in high technology computer and networking fields--doors which have been essentially closed until now.

A third project under way is the *La Plaza Telecommunity*, which is the first and only active community network in New Mexico. La Plaza Telecommunity's mission is to provide and utilize technologies that can unite individuals, organizations and communities and serve their informational needs in an increasingly complex world. La Plaza is located in Taos, New Mexico and currently serves approximately 15% of the local area population (i.e.-those who are within a local phone call to Taos).

La Plaza was designed as a community-only-based information resource that incorporates change and flexibility as it strives to meet its mission goals. At the same time, La Plaza has encouraged and requested input from the local community to incorporate the needs of the individual in the community, as well as individual business components.

La Plaza provides free access to local users to a variety of local, state, federal, and world-wide information resources through the Internet. La Plaza also provides 68 hours per week of individual and in-person help assistance, and offers free classes and tutorials for specialized training on utilizing the Internet, as well as a host of personal or organizational needs. La Plaza has made every attempt and effort to take a leadership role in community networking, while continuing to maintain a humanistic approach to utilizing computer and Internet technology.

La Plaza was a finalist for the 1995 National Information Infrastructure awards, and was recently awarded a three-year, $900,000 grant from the W. K. Kellogg Foundation. This money will be used to further develop and broaden its community based network.

The final project to be mentioned is *ZiaNet*. ZiaNet was established to support education, business, social services, and personal development opportunities for

New Mexican residents. ZiaNet provides access to a variety of information resources residing among New Mexican libraries, both public and university, as well as to national information networks and resources at affordable prices.

ZiaNet will:

- support educational opportunities for all levels of education
- enhance distance learning programs
- assist New Mexican residents in computer usage and training and
- support health services and professionals staying informed of recent medical developments

ZiaNet will meet these objectives by:

- utilizing existing state and national telecommunication networks
- offer gateway options to the Internet
- Provide toll-free access via modem to those who do not possess direct network connectivity
- provide training
- provide document delivery and
- encourage local database development on state legislative, state contract purchasing, job opportunities, economic development, social services, health programs and travel and tourism

ZiaNet is still in its developmental states and is soliciting bids as of this writing to construct its Internet connection.

While all these projects are individually unique and will provide much needed access to interested parties, New Mexico is still far behind in its efforts to bring the population, particularly the outlying areas, into the fold. "For such systems to truly become instruments of democracy, they must be made accessible to and used by the greatest number of people possible." [28]

Conclusion

Whether at the state or national level, access will only be ownership when all federal depository libraries are regarded as the only safety net in providing government information regardless of format. Administrative efforts must address the need for an equitable infrastructure. Libraries should not be excluded from the FDLP based on financial disparities. Furthermore, the FDLP must evolve as a partner to the NII.

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CONFIGURING THE LARGE LAN FOR TCP/IP, APPLETALK AND NOVELL

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Paper not submitted for publishing

TEACHING INTERNET USE TO ADULT LEARNERS:

The LANL Experience

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The Research Library at Los Alamos National Laboratory has been teaching an Internet class to adult learners since May 1994. The class is a team effort, combining lecture/demo with hands-on practice using Gopher and the World Wide Web.

The idea for the class came from Dan Comstock, a librarian working in CIC-15, Advanced Database & Information Technology. This group is comprised largely of programmers and others with computer backgrounds. There was an awareness in the group that there were vast resources available on the Internet, but no one seemed to know how to access them. With Sharon Smith, an idea was developed to present a class for our co-workers in CIC-15 and the Research Library to familiarize them with the variety of resources available using the Gopher protocol, and how to access them.

What started out as a small short-term project has become a weekly class available to any Lab employee or associate. More than 250 people have been taught to find basic reference materials and to navigate the Internet on the Gopher and World Wide Web. The class is one of the first classes offered by the Research Library to be filled every month, and one Laboratory group has recommended that their staff attend this class in preparation for more advanced Internet and HTML classes as part of their group training. The success of this class spurred development by the Research Library of more specific subject classes using Internet resources, specifically business and general science resources.

We've been asked many questions in the 18 months we've been teaching. We've also asked many questions ourselves. Here are the answers to a few of them:

1. Doesn't everybody in Los Alamos already know about the Internet?

The answer is obviously no. Not everyone who works at Los Alamos is a computer wizard. The technical staff at the Laboratory is made up of physicists, chemists, engineers, material scientists, biologists, mathematicians, computer scientists and others. The support staff includes librarians, accountants, various technicians, secretaries, editors, programmers, technical illustrators, contract specialists, maintenance workers, security personnel, etc. In short, the Laboratory staff consists of all the myriad professions it takes to maintain a large scientific research institution. Our class is open to all.

2. How do you teach your class?

We use humor and personal anecdotes as our primary teaching tools. Personal anecdotes in particular are useful for showing that the teachers use the Internet for real work, that we find it useful, and that we are just as lost as the students are (except that we have a few tricks up our sleeves).

The first half of the class is structured to present key concepts in the lecture/demo, using practical, real-life examples as illustrations. The second half of the class is a hands-on creative play session in which students practice finding or not finding materials on any subject they choose, with assistance from the instructors.

We use both overhead and computer projectors in the class, using graphics and cartoons to illustrate the major lecture points. For example, we start with a cartoon of a man peeking out from a computer screen, asking the woman at the keyboard, "Excuse me, can you show me the way to the Information Superhighway?" With this, we try to make the students comfortable with the idea that being lost on the Internet is normal. The amount of lecture time often varies because as questions come up during the lecture we incorporate them into the lecture. Today's classroom anecdote is often the next week's lecture point.

3. Why did you start with the Gopher?

The Gopher protocol was at its peak with dozens of new sites appearing every day at the time we began planning the class. It was the fastest and easiest way to access information without having to learn to use commands. The menu structure led people directly to information resources without having to know specific addresses.

Originally we titled this class "Finding Information Resources Via Gopher, or the Luxury Bus Tour of the Information Superhighway." We were using all the popular automotive cliches even before they became popular. We taught from the Los Alamos National Laboratory Gopher, reasoning that our students should know what is available at home before they go out into the world. We began by using a simple telnet connection to Gopher to show the menu structure without a lot of hype, and later we added a quick demo of the menu structure using Hampson's Gopher software.

The main LANL Gopher menu, while possessing many strengths, did not point to a large number of specific subject or reference materials that might be used in a library. Not only did we want to show students how to find some basic sources, but we also wanted to give people the confidence to find and use others.

The Laboratory's Gopher had links to RiceInfo's subject listings, Veronica and Jughead searching, and to worldwide Gopher listings. We used these to help people find resources on specific subjects or information about organizations or locations.

In the fall of 1994, the LANL Research Library also entered the Gopher/Web scene. The Library's Gopher appeared in November, followed directly after by the Library's Web page in December. Both of these have subject listings applicable to Laboratory interests, i.e., physics, chemistry, job listings, etc. We were able to incorporate use of these resources into our class.

For many people at the Laboratory a simple telnet connection is their main access to Internet resources. This is changing over time; however, we still have classes where people only have telnet access.

4. Why did you change to the Web?

As the Internet world changed, our class evolved into a Gopher/Web orientation, and now is taught strictly on the World Wide Web, with Gopher being taught on demand. As media hype and student interest increased, we

began to add a segment on the Web into our classes in late 1994. At that time, the LANL Web was well established, and the Library was starting to develop its own Web page. It has been obvious from the first that the Web is supplanting the Gopher. We are finding new library resources on the Web outnumbering those on the Gopher at about a rate of four to one. People are not posting new things on their Gophers, and what is there is not being maintained as well.

The Web is, in many ways, the Luxury Bus that ran over the Gopher. The LANL Gopher will be phased out in January 1996, and the Research Library will follow suit.

The shift from Gopher to Web has not been easy. We had discussed the Web off and on, but our main objection to the Web was the amount of time it took to load those huge and often extraneous image files. Also, the Gopher environment is more structured, and often easier to understand than the free-form Web. The Gopher, with its strong ties to the university community, often has more solid information coming from more reliable sources, however, the newer information is appearing on the Web, and on the Web alone.

Another factor in favor of shifting to the Web is that Web browsers can read Gopher items, and they do point to good Gopher items.

We use the LANL Home Page as our starting point. We then go to the Research Library's home page, and demonstrate the subject folders that have been created to reflect the work of the Laboratory. From there, we demonstrate various search engines, and talk about other subject resources, such as Yahoo. We have handouts that list URLs for these
searching tools.

5. How do you deal with different computer platforms?

Frankly, we don't. We only have PC clones in the training room. We knew we would have students who only were familiar with the Macintosh environment, and who had never used Windows. Luckily, most Macintosh users adjust quickly. The PCs are connected to the Library's internal network, which includes our CD-ROM databases, connections to other libraries, and word processing software. We wanted the students to focus at the beginning of the class on learning about the Internet, not the internal network, or how to make a PC work. When we start the hands-on phase of the class, we walk the students through the terminal sign-on, and get them to the menu that gives them options for Gopher, Mosaic and Netscape. We stand by to help with questions, dead-ends, and the occasional system reboot.

In the middle of our first summer of teaching, the training room was closed for remodeling. This remodeling is still in progress. We enter the room every week not knowing what will be stored there, or whether the back row will have room for chairs. We currently have five terminals available; classes are limited to ten people, and we ask that they share terminals.

Questions from the Class:

1. You mean just anybody can put up a Web page?

One lesson we try to teach is that the validity of Internet resources isn't always rock-solid. Sources can be accurate, and can be quite good. Sources can also be very wrong. For example, we found a geographical database that gives the altitude of Los Alamos, New Mexico as 575 feet, (the correct altitude is 7,200 feet), and yet this database comes from a major Midwestern university.

Another example is Todd's Atomic Page on the World Wide Web. We don't know who Todd is, or why he is interested in nuclear science, although he does give personal information on his page. We do know that he points to some very good resources, including LANL. We check his page every now and then to see if he has found some good resources that we can use. No offense to Todd, but how do we know how valid his information is?

2. Where is that thing I found last week?

A class on Internet resources is not just created and then taught exactly the same from week to week. The environment is changing far too quickly. Teaching anything about the Internet is like herding cats - you think you've got it under control, and then things start happening. Just as we teach in class, the great resource you found last week has probably moved or disappeared by now. The connections may be down to everything on the East Coast. It may be exam time and all the servers you want to use may be so overloaded they're hemorrhaging bits and bytes all over cyberspace. RiceInfo may have changed its menu structure for the fifth time this week. We try to use these real-world examples to show students that there are many Dead-Ends on the Information Superhighway, they are pretty well unavoidable, and it's best to just laugh a little and try again. We've never made it through a class without at least one.

3. How do I get there from here?

Sometimes you can't. Even if you can, sometimes everything won't work. Individual computer setups are beyond our control. We do not even try to explain to people how to connect to the Internet from their office. We refer students to the Laboratory's computing groups, and to the computer system administrator in their group or area. The Laboratory has no one standard, and individual setups vary from fast network connections down to 1200-baud ASCII dialup terminals. We also are often asked about Internet connections from home. While we can describe in general terms what using a SLIP/PPP connection is like, we suggest the student contact an Internet provider and let them supply the specific answers.

We also do not try to explain things such as e-mail, listservs, Usenet, or other things outside the scope of Gopher/Web. There just are too many ways to access these, and too many variations to be addressed in a general class that only lasts two hours.

4. Where will I find time to search the Net enough to really know how to use it?

We are teaching in a world that demands exploration to people who do not have time to waste; a world that is not organized in any logical fashion - and it is getting bigger by the minute. Our students are people who don't have hours to spend roaming around the Net finding "cool" things to share with their friends. One of the advantages of our hands-on time is that this is time the students already have scheduled to spend on the Net. Our intention is to give students a comfortable look at the Net and give them a few hints on how to search for resources, not to try to list every single good resource for them. Our hand-outs give URLs for a few search engines, subject lists, and listings of Web pages by location.

Often people need information about a specific institution or location. The fastest way to find the phone number for someone on the faculty of a given university is to go to the university's Web page and find the faculty directory. Laboratory employees often travel to other labs or universities to collaborate on experiments with other researchers, so these directories are quite important to them. Basic travel and weather information, hotel and restaurant listings, and transportation guides are also quite useful to them.

5. Will I get hantavirus from the computer mouse?

We assume a basic computer knowledge in our classes, but we often cannot assume that our students have even seen a PC before. The concept of double-clicking with a mouse befuddles the DOS folks; the Macintosh users flinch when they find a training room full of PCs. It is to our advantage that we have backgrounds in both environments, as well as UNIX and VAX/VMS.

On the other hand, there are also people in our classes who may use computer databases every day as part of their job, but haven't had a reason to use databases outside their own home systems. We often digress into explanations of domain names or of each machine/file having a unique address. This is particularly important in teaching the idea of URLs on the Web. We had originally hoped to set up prerequisites for our class, asking that all users have password access to the main Laboratory communications network, and that they have experience using e-mail. These turned out to be too much to ask for. We have had to explain everything from the concept of double-clicking to how to find out online what your own e-mail address is.

If we are faced with basic computer questions during the lecture portion of the class, we often ask the questioner to wait until the hands-on portion of the class so we can give him or her better individual attention. This keeps the class moving. Often, the person sharing the terminal with that person will assist the novice in finding things. This is where our crowded training room becomes an unexpected advantage. It also helps that we work together to answer questions; it gives the class a congenial feel, quite different from the traditional lecture hall atmosphere.

6. Is the Lab really looking at everything I do on the Net?

Another point we try to make is that like Hill Street Blues, you need to be careful out there. Look before you leap. We use the analogy in class that just like when you travel around the world, you will encounter different cultures on the Internet. We are coming from a professional world, with professional standards of work conduct. On the Internet we may find ourselves in places that do not fit those standards, and we will probably end up in those places just when the boss is looking over our shoulder.

LANL does have a policy about use of Laboratory equipment only for work-related activities. This policy is enforced, and yes, they do check. Our network connection to the outside world is monitored closely, and if there is any suspicious activity we are asked to explain. When we stumble into places we shouldn't be, we get out. We encourage our students to do the same. Hopefully we do this in a non-threatening manner. What we stress is that accidentally connecting to Miss Kitty's Pleasure Palace Home Page once and immediately leaving is OK, but connecting to it six times in half a day may not be wise.

7. How do I get my e-mail off the Web? Where is the phone book for Podunk, Iowa?

Students also approach the class with the expectation that will find everything they ever wanted to know, with full text, pictures, and sound clips. One of the first things we explain to them is that copyright law prevents this from happening with most published materials, and a large portion of what is available is either severely limited or is available only to those who pay for access.

An expectation we see in every class is that there will be a magic phone book listing numbers and addresses for everyone in the world. Another is that journal indexes just like those on Dialog and other commercial online systems will be available for free. This sometimes happens for a brief period on isolated systems when a test is being run, but unless you find out before everyone else does and the system is overloaded and shut down,
forget it!

8. Why can't I get my friend's article from the Journal of Applied Esoterica on the Net?

Another expectation we often find in our students is that the full text of every journal in the world is online. These expectations come from the media hype about the Internet that is heard literally every time a TV or radio is turned on. Advertisements from commercial Internet providers add to this myth. Journal publishers will often list their titles as "on the Internet," but in reality only a few articles will be available on the publisher's home page, along with information on how to subscribe.

9. How do I sign on to the Web at home? I have a really nice TV set I could plug into!

Los Alamos has a high proportion of homes with at least one PC, estimated at 2/3 or higher in recent surveys. We are often asked how to connect to the Net from home so that people can pursue their interests in dog training, Star Trek, or microbreweries. The answer to "how do I connect" is usually "it depends." There are many factors involved, such as what speed the person's modem operates at, if he or she has one at all, availability of a phone line that can be tied up for many hours at a time, etc. The idea that one has to have a computer, a modem, Internet access, software and a phone line to reach the Internet and read the Web can be overwhelming.

10. How much is this costing me?

This question is put to us more often by people who are accustomed to using commercial online services such as Dialog and CompuServe, or who access the Internet from home using a commercial provider. Since LANL pays for our access in the work place, the real costs are transparent to the users and there is no connect-time charge involved. For new users, the idea that the Web is full of commercials and subscription-only databases is often a surprise, but they soon learn that someone has to pay to provide all those pretty pictures.

11. Who's the best Internet provider? Should I use a provider or use America Online/Prodigy/CompuServe?

It is with this question that we most often find ourselves explaining other aspects of the Internet, such as the subtle differences between e-mail and bulletin boards. The concept of a provider is often hard to explain. Providers can give you many things such as electronic mail, news services, and discussion group bulletin boards in addition to Net access. The idea that all these things come over the Internet, and yet may not have access to the Web,
is hard to understand.

Of course, we cannot recommend one provider over another. However, the discussion that ensues from those who do have Internet access at home is always lively. The major concerns are cost for connect time, quality of provider service, and range of services offered.

12. I did a WebCrawler search, and got all these hits. Which one do I choose?

This is probably the most difficult concept we teach: the first result you pick may not be the "right" one. Yet adults often have trouble taking the risk. In many ways this is the last great hurdle to effective Internet use. We must recognize that any one search is not conclusive, and it may take a number of different approaches to get a comprehensive result.

What we have learned about our students:

We are working with adult learners. Not all of us at LANL are rocket scientists -- some of us are plain old librarians or accountants or trainers or editors. But all are bright, literate, well-read adults. Most of those in our classes have been out of school for quite a while. We have to present our material in a clean, clear fashion that recognizes these people have real work-related needs. Not many are in class to find rock lyrics online (although no doubt some have been).

There are no stereotypes in our classes. The prevailing myth is that young people already know about the Internet, and that we older people are resistant to that. That simply isn't so. We get first time users of all ages. Many smaller schools do not have the depth of network connections, so many of our summer students are learning about the Internet for the first time. Some of the most enthusiastic learners are the older scientists who have quite literally seen it all. One of our retired mathematicians, back as a consultant, flipped when he saw how easily he could find information on a research institute in Poland where some of his colleagues worked. He called every day for a week with new discoveries.

We believe our class opens new doors for our students, and enables them to find and open even more. We urge them to explore on their own, and to have fun doing it. The real life learning adventure has just begun for them and for us.

DISTANCE LEARNING AND LIBRARIES IN THE CYBERSPACE AGE

by: Edward Erazo and Roberta L. Derlin, New Mexico State University

ABSTRACT

The growth of telecommunications technology for distance learning in the Cyberspace Age has opened many options for studying off-campus from home or office from remote and sparsely populated communities. Higher education is exploring this modern version of correspondence courses with the goal of increasing their student enrollment as well as making their degree programs more readily available. An integral component to the success of these programs is the extent and strength of the library support that can be offered to this new generation of distant learners. This presentation will examine some recent library success stories in "digitizing" libraries and explore several options in developing electronic library support for distance learning. The future of distance learning is tied to the future of higher education.

INTRODUCTION

Distance learning (DL) can be defined in the most general terms, as a method of education that involves an instructor and student(s), who are separated geographically and must rely on one or more methods of long-distance communication. It is the direct descendent of correspondence and home study courses, that were developed in the 19th century and relied on the post office to keep the instructor and student(s) in contact. American correspondence study flourished from 1873-1897 under the guidance of one of its leaders, Anna Eliot Ticknor, the "mother of American correspondence study," who founded the Boston-based Society to Encourage Study at Home (Holmberg, 1986). Ticknor also originated the exchange of comments as well as grades with students. In fact, distance learning can be traced to 1728, when the Boston Gazette advertised shorthand lessons by mail (Verduin and Clark, 1991). Distance learning then is certainly nothing new. What is new, however, is the wealth of telecommunications options available today that enable the provision of this high-tech educational environment. The information technology available today permits a variety of delivery options (Bates, 1995): one-way technologies, such as print, audio and video cassettes, instructional television (pre-recorded and broadcast), radio, and computer-based (multimedia) learning; two-way technologies, such as audio (telephone only) conferencing, teleconferencing (television and telephone) and computer conferencing (group "chat" on e-mail). This information technology will be used increasingly to provide quality instruction to ever-growing numbers of students. This includes not only the original target group of geographically-isolated students, who are indeed distanced from campuses, but local working adults as well, who can not attend on-campus courses because of family and professional obligations.

The Commission on Colleges of the Southern Association of Colleges and Schools (SACS) offers this detailed definition of DL (Mizell, 1994):

> Distance learning is that educational process that occurs by delivering instruction designed to accommodate students who are physically remote from the main campus or from a location of campus or program origin. In this process, the requirements for a course or program may be completed through face-to-face interactions and/or through remote communications with instructional and support staff including either one-way or two-way written, electronic, or other media forms.

THE ROLE OF LIBRARY SERVICES

Primarily, library services on campus support the curriculum with a basic level of service, which organizes materials and provides reference assistance. Within the distance learning environment, off-campus (or extended campus) library services can be defined (Hammer, 1994) as:

> Those services offered in support of academic courses and programs offered away from the main campus of the institution responsible for the academic program. These courses may be taught in traditional or non-traditional ways. This definition also includes services to individuals who are involved off-campus regardless of where credit is given. This definition does not include non-traditional students pursuing on-campus academic programs.

Library services off-campus should be very similar to on-campus services. In fact, on-site and remote-site library use is a consideration for the on-campus student population since so many of them now work from home or office. Library services should include full inter-library loan service, reference services, document delivery services, and electronic database services. Additional services should also be provided for these students, such as an 800 number for call-in reference service and special document delivery from the library in the form of full fax and mail service of most library materials. However, the relationship of time and money as well as use policy considerations will ultimately either facilitate or restrict the progress of off-campus library services. A few years ago, in a study on distance education programs in Canada, Alexander Slade observed that while politicians and educators have both heralded distance learning as a means of increasing accessibility and reducing educational costs, they have been generally silent on the issue of off-campus library services (Slade, 1991). The situation remains much the same today.

ROLE OF LIBRARIANS

Library services for off-campus students bring with them a new role for librarians. A role that insures that off-campus students are in no way at a disadvantage compared to their on-campus counterparts (Latham, 1991). Librarians need to expand their traditional roles and work more closely with off-campus instructors and students to provide materials and reference as well as instructional services. Methods for providing bibliographic instruction to obtain access from remote locations must be developed. Special guides and supplemental materials must be prepared by librarians and must be also made accessible electronically from remote locations. Special document delivery methods must be arranged for distance learners. All these services should be provided by a specifically-assigned support staff and a designated librarian. Otherwise, these services fall on a library reference staff already dealing with both a campus and a community population. Librarians should embrace these new opportunities to redefine their roles and take a proactive stance, as eagerly as they welcomed and grasped the technological innovations that so rapidly changed their libraries (Latham, 1991).

ROLE OF FACULTY

Faculty need to recognize students' library needs. Before the advent of information technology, library skills were something you learned just once. The high-tech environment of libraries now necessitates that students and faculty periodically re-learn library skills within this new environment. Tony Bates, an authority in information technology and educational media and a founder of the UK's Open University, states that faculty need to know not only how to choose and use the appropriate technology, but also how their students will learn and use it. Bates also remarks that the lack of appropriate training is the biggest barrier to the use of technology in education (Bates, 1995). Faculty must take this into account when they send their students to prepare library assignments. Students should expect that library instruction will be available to them off-campus as well as on campus to support them in the preparation of their library assignments.

Faculty also need to interact with librarians to insure that the library can support their students' classwork. That is, faculty should collaborate with librarians at the curriculum level. The class librarian can suggest materials that could be used to support the instruction and facilitate library assignments. One example serves to illustrate the importance of this point. NMSU has run a graduate distance education site in the summer at San Juan College in Farmington, NM for a number of years. As recently as last summer, they did not have internet access and the local library can not meet all the needs of these graduate students. Students come from as far as six-hours away; and the nearest adequate library is a more than a four-hour drive away. In this instance, library access drives instructional strategies. Hard copy materials must be brought to the site and/or student activities are redesigned.

TWO SUCCESS STORIES

The Oryx Guide to Distance Learning: a Comprehensive Listing of Electronic and Other Media-Assisted Courses (Burgess, 1994) includes information from 298 fully-accredited post-secondary institutions from 44 states, which offer more than 1,500 media-assisted courses for which full academic credit can be earned. (Interestingly enough the six states not included are Delaware, Hawaii, Mississippi, New Mexico, Montana and Vermont.) These institutions are accredited by one of the following eight agencies: American Association of Bible Colleges (AABC), Distance Education and Training Council [formerly National Home Study Council] (DETC), Middle States Association (MSA), North Central Association of Colleges and Schools (NCA), New England Association of Schools and Colleges (NEASC), Northwest Association of Schools and Colleges (NASC), Southern Association of Colleges and Schools (SACS), and Western Association of Schools and Colleges (WASC).

Obviously, distance learning is booming. Library services to support these classes are another matter as has been mentioned. Each accreditation agency has its own guidelines for distance learning and its academic support, including library services. It is interesting to note that the North Central Association of Colleges and Schools (NCA), the accreditation agency for the State of New Mexico, does not mention off-campus services for libraries, but puts them in one of the four accreditation criteria, which covers library services (Hammer, 1994): "an accredited institution has effectively organized adequate human, financial and

physical resources into educational and other programs to accomplish it purposes."

Some institutions, however, have emerged as good examples of providing innovative and substantial distance learning and academic support for their students. Two will be discussed, one in Florida and another in Alaska. Considered among the institutional leaders in distance learning is Nova Southeastern University (NSU, formerly Nova University) in Florida (Mizell, 1994). They offer both undergraduate and graduate programs. Almost half of their 12,000 students are enrolled in distance education classes. NSU uses the following online tools and resources: 1) audiobridges (toll-free telephone connections for two-way discussion); 2) videotapes; 3) audiotapes; 4) telephones; 50 electronic mail; 6) the electronic classroom (virtual classroom through split-screen technology); and 7) the electronic library (catalog and delivery service). Of these, number six, the electronic classroom, merits additional explanation. Using the UNIX system, an electronic forum is created in which the student and instructor may interact simultaneously. This is called the "talk" or "chat" mode on electronic mail. The screen is divided in two. Instead of a 50/50 split of the screen, the screen is divided in a 33/66 split. The top one-third is used to register the names of the students, who have logged in, and is also reserved for the remarks of students, who are "called on" by the instructor. The lower two-thirds is reserved for the course instructor to display previously prepared material or to enter questions or comments during the class--in real time. By far the most popular method is what NSU calls its cluster-based programs located in sites around the country, which hold once-a-month classes plus the use of some of the previously mentioned online tools and resources. NSU operates distance education programs for non-resident students in 30 states (Mizell, 1994).

Another institutional leader in distance learning is the University of Alaska, Fairbanks (UAF). Because of the numerous rural degree programs in their state, UAF recognized early the need for information resources to support them (West, 1992). For many of the students enrolled in Alaska's distance delivery programs, mostly through audioconferencing, it may be their first contact with higher education--making it all that more important. To serve undergraduates, graduates and non-degree students as well as this new population of their academic community, The Elmer E. Rasmuson Library at UAF replaced their traditional library services with a distance delivery program of their own, primarily through the use of electronic technology. Sharon West explains how they did it (West, 1992). They established an Extended Campus Services (ECS) unit with full document delivery and information brokering. They established both a reference question mailbox on the University of Alaska Computer Network as well as another mailbox for interlibrary (ILL) requests. The latter were processed within 48 hours, and packets were either mailed out or faxed to the patrons (scanning and sending electronically proved too time-consuming). They established a special phone line (voice-mail did not work) from 8:00 AM to 5:00 PM and trained staff, that assisted librarians, to conduct reference interviews on the phone. Telephone call backs were also used to request more information and improved overall patron satisfaction. They embarked on a publicity campaign to advertise these special services. Library faculty members began teaching a distance education course on information-seeking skills and going out to the branch campuses once a year for consultation. The only drawback seemed to be that these new services were developed without additional funding and were initially seen as special services for off-campus students at the expense of the on-

campus ones. Librarians also conducted research for the off-campus students, which again was seen as going beyond traditional library practice. The on-campus political environment, then, must also be factored into the planning of these extended services (West, 1992).

CONCLUSIONS

Librarians must develop and fund expanded services to meet the demand created by the new distance learning in the Cyberspace Age. Librarians must teach distance learners the Internet, Netscape, World Wide Web and access to a variety of CD-ROM databases. They must also prepare "how to" research guides and make them available electronically. Distance learners should also take a special computer applications course as soon as possible in their distance education program. Course work in information technology should also be expanded. Some other areas for development include: on-line tutorials, such as a library instruction homepage; Online Catalog Library Center (OCLC)'s First Search experimentation; and demonstrations and instructions on how to telnet to the library using a variety of access paths, including those available from commercial services. Faculty should work with librarians to anticipate distance learners' needs and develop strategies to meet them.

Only once the primary library concerns of staffing and funding can be settled, can library services begin to exploit the technology available today to better serve their on- and off-campus students. Distance learning using information technology grows continuously in the Cyberspace Age. As more students attempt to accommodate their studies around busy family and professional lives, it promises to become increasingly important in providing an alternative to traditional on-campus education. Only by planning to meeting these challenges of this new environment, will libraries be able to serve the higher education community of the 21st Century.

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LOCAL AREA NETWORK:
What Can a Library Do With It?

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INTRODUCTION

With the ever growing interest that libraries have in the Internet, the potentials of other computer resources may be overlooked or under-utilized. One such resource is the campus local area network. For libraries, a campus LAN presents possibilities ranging from simple library promotion to networked databases. And while the Internet certainly provides unlimited, although sometimes unreliable resources, a local area network can provide controlled, relatively reliable and custom-tailored resources and services for a campus.

GOALS OF THE NETWORK FOR THE LIBRARY

In his book Library LANs, Breeding states that "the main purpose of a LAN involves sharing computer resources and facilitating communication among computer users" (Breeding, 1992). This definition of a LAN falls right in line with what libraries attempt to accomplish - that is sharing all types of resources with library users and establishing contact with patrons through service, instruction, etc. Campus LANs provide an excellent vehicle in which to deliver and provide library services and resources.

Whenever possible, NMSU-Alamogordo Library attempts to make use of the campus LAN to enhance and expand upon the traditional services and resources that we offer to our campus users. We also attempt to provide new and unique library services that are made possible due to the availability of the campus LAN. In reviewing the ways that the library makes use of the LAN, several general areas of use become apparent: Library Instruction, Library Services, Automation Supplement, Database Access and Library Promotion. This paper will discuss NMSU-Alamogordo Townsend Library's use of a campus local area network in these general areas.

THE LIBRARY

New Mexico State University-Alamogordo is a branch campus offering associate degrees and certifications to 2000 full and part time students. NMSU-A's Townsend Library has a collection of over 35,000 volumes, 400 periodical subscriptions, and several thousand audio-visual titles. The library staff includes two full time librarians, three full time and two part time library staff members, and five work-study students. We are currently in the process of reclassification, and retrospective conversion in preparation for becoming automated within the next year.

Our primary goal, like that of most two year college libraries, is to support the college curriculum, as well as the faculty, staff and students, with our collection and library services. Since NMSU-Alamogordo campus is networked, the library takes opportunities to incorporate the use of the campus network in working towards this goal.

THE CAMPUS LAN

Townsend Library at New Mexico State University-Alamogordo, with the assistance of the campus computer center, provides eight public access

Internet terminals which also serve as access points to the local area network. The library sees the Internet and the local area network as complimenting each other in the resources and services that they each provide to library users.

NMSU-Alamogordo has a Novell local area network on its campus. The local area network is connected to a wide area network (WAN) located in Las Cruces. The WAN then connects to the Internet, allowing any NMSU-Alamogordo computer connected to the campus network access to the Internet as well as the local area network.

The campus system administrators have loaded an electronic mail program called Pegasus Mail or Pmail to the local area network. In addition to allowing the delivery of electronic mail to individuals or groups, Pmail provides a function called Noticeboard. Noticeboards, which can be created for any area of interest, act as public boards for posting messages to the entire network. As faculty, staff and students logon to the local area network, they are electronically notified of any unread messages on all of the Noticeboards.

The Noticeboard option makes the local network an excellent vehicle for distributing information to a variety of campus users. Upon considering the electronic resources available, one librarian suggests that

> newsletters, current awareness services, and selective dissemination of information are typical outreach services...with the recent growth of electronic formats, wide availability of microcomputers, and attendant ease of use, it is wise to consider, or reconsider, the application of these services (Elder, 1994).

In order to reach as many campus members as possible with library-related information, the NMSU-A Library had a Library Noticeboard created. Messages put on to the Library Noticeboard can be removed and edited only by a campus systems administrator or the library administrator in charge of the Noticeboard. Many of the services and resources discussed in this paper take place on the Library Noticeboard.

The local area campus network has the potential of reaching a large portion of the campus. Staff and faculty receive a campus account for free when they begin working at NMSU-Alamogordo. Students must pay a $10.00 computer use fee, or be registered in a computer class (which charges an additional $10.00 in the tuition), in order to receive a campus account. The campus account provides unlimited access to the local area network as well as to the Internet.

AREAS OF LAN USE

The library's use of the campus local area network takes many forms, but can generally be divided into the tracts of: Instruction, Library Service, Automation Supplement, Database Access and Library Promotion. The multiplicity of the LAN's use is clearly demonstrated by the various library resources and services found on the network.

INSTRUCTION

In discussing electronic resources available to library users, one library suggests that "to exploit these information resources, electronic instruction could be made available over the network...innovative approaches need to be developed for such instruction" (McClure, Moen, & Ryan, 1994). NMSU-Alamogordo Townsend Library has utilized the campus network as a place to provide electronic instruction. Most of this library instruction comes in the form of instructional sheets posted to the network on the Library Noticeboard. The instructional sheets are available on the network until we remove or update them, so campus users can refer to them at any time, as needed.

Since the campus networked computers (in the library as well as around the campus) can typically access the Internet as well as the LAN, the network seemed to be an appropriate place to provide instruction about the Internet. The library has developed a series of Internet instructional sheets covering the topics of Telnet, Listserv, Gopher, FTP, WWW, and Netscape. These sheets are available in print and are also readily available on the network.

Included in the electronic instruction available on the NMSU-Alamogordo network are various bibliographies produced by the library. These bibliographies include traditional library resources, as well as a few "bibliographies" of Internet resources available on specific subjects. In addition to Internet instructional sheets and bibliographies, the library also provides instruction on basic library use. Examples of this basic instruction include sheets on "Finding a Book at Townsend Library," and "Finding an Article at Townsend Library." Another benefit of posting this electronic instruction on the network is that as new faculty, staff and students come to NMSU-Alamogordo campus, these instructional resources will be available for them, so ideally we "instruct" most new campus users.

LIBRARY SERVICES

In one study on library networking, it was explained that "the librarians thought that it was essential to provide traditional services in the networked environment" (McClure, Moen, & Ryan, 1994). Working along this same line, NMSU-Alamogordo library established it's own email address (LIBINFO@nmsua.nmsu.edu) to "electronically provide" traditional services. The LIBINFO address can be used by faculty, staff or students needing any library-related information. Although it is in its early stages, we hope that LIBINFO will be used to address any type of library information.

Since the NMSU-Alamogordo campus is relatively small, we anticipate being able to accept such things as Interlibrary Loan requests through LIBINFO. We can assume that in order to send an ILL request, the person will need to have their own pmail address, thereby allowing easy communication between the patron and the library if additional bibliographic information is needed. Additionally, it seems reasonable to assume that we could accept campus document delivery requests by faculty/staff through LIBINFO since we have campus mail delivery several times a day. The document delivery service would compliment a "Current Contents" service already offered to

faculty/staff in which we send the contents page of requested periodicals. We base the introduction of these electronic library services on the premise that innovative mediums, such as the electronic network, can enhance and improve the provision of traditional library services.

AUTOMATION SUPPLEMENT

The Townsend Library at NMSU-Alamogordo has been in the preparation stage of automation for many years, and in the upcoming year we plan to join the automation system of NMSU Main Campus. Until that point, however, we attempt to provide as much information as possible about the library's collection to the campus, through the local network. Like an online catalog, the collection information remains available on the network at any time, and can be edited or revised by library staff as the need arises. The information that we are able to provide on the campus network certainly can't replace an online catalog, but it can provide useful information about the collection, and in this way serve as an automation supplement until the online catalog is in place.

Examples of collection information that we provide on the network Library Noticeboard include a List of Feature Films, a List of Informational Videos, and List of Current Newspapers available in the library. A Current List of Periodicals has provided expressed appreciation by various faculty and staff who are quickly able to determine if the library holds a particular periodical.

Finally, as we receive and process new books, we utilize the efforts of a library volunteer to type a list of new books received in the library. Once this list of books with appropriate call numbers is compiled, it is loaded into the Library's Noticeboard. In this way, we provide an electronic "New Book Shelf" to the library patrons around campus. Although finding this type of collection information is a simple task if an online catalog is available, there is little opportunity to provide this information without an online catalog, so the LAN proves to be a very valuable option.

DATABASE ACCESS

The campus local area network is, of course, an excellent location in which to provide access to electronic databases. One librarian explains that "access to network resources can be accomplished either by bringing the resources to the library or 'taking' the users to the resources" (McClure, Moen, & Ryan, 1994). At Townsend Library, we attempt to "bring" resources to the library/campus *and* "take" users to resources available elsewhere.

The Computer Center and the Library joined together to purchase a CD-rom tower for the campus network. The library can provide CD-roms on 4 of the 7 drives available on the tower. A periodical index called **Academic Abstracts** was the first CD-rom that we installed on the network. Academic Abstracts is the primary periodical index used by our students in the library. By putting Academic Abstracts on the network, we provided 8 terminals capable of accessing the database in the library - this is 6 more computers with access than before the network tower was installed. In addition to the increase in Academic Abstract computers in the library, campus-networked computers outside of the

library can now also access Academic Abstracts. Staff, faculty and students can easily connect to Academic Abstracts and do library research from their office or in one of the campus computer labs due to the CD-rom being available on the campus LAN CD-rom tower. In this way, we are "bringing" resources to the library and campus. (We are conducting ongoing research to determine which additional CD-rom products will best provide for the needs of our students, faculty and staff.)

Projects to "take" the user to other resources include a subscription to the **FirstSearch** databases, with access through the Internet. NMSU-Alamogordo is a member of the recently created NMCAL/LEIAN FirstSearch consortium that provides access to a variety of FirstSearch databases. In order to make these databases easily available to users, we are working with the systems administrator to have an automatic connection and logon to Firstsearch. By simply logging on to the campus LAN through a computer anywhere on the campus, users will be able to type a command and automatically connect, through the Internet, to a variety of databases available on FirstSearch. Again, the local area network provides the capability of searching from anywhere on campus - not just in the library. In a LAN, libraries have the perfect vehicle for delivering database access to an entire campus.

LIBRARY PROMOTION

The final area of LAN use for libraries to consider is perhaps the most detailed-oriented yet general in nature - library promotion. Library promotion can happen on many levels. There is the practical and detailed promotion of things like library hours and policies as well as the more generalized promotion of the library as a place that has something for everyone. The benefits of library promotion by computer include the fact that it "can reach a large number of users...can be constantly available to the user...can be used anywhere...alterations and updating can be easy" (Malley, 1985).

NMSU-Alamogordo uses the Library Noticeboard on the network to update users on routine information such as Library Hours, Library Events and Workshops. The network at NMSU-A is also used to promote more general aspects of the library, such as the collection (special books, etc.), special services, and resources. Posting this type of information on the local area network is especially helpful as it does reach a "large number of users" and messages can be easily removed or edited by library staff when needed. It is realized, however, that "one might argue that many of these announcements are already made in libraries without computer facilities...it is accessibility from outside the library that gives the computer the edge" (Malley, 1985). "In-house" promotion reaches only those who happen to come into the library, whereas computers reach out beyond the library building.

Perhaps the most universal of all aspects of library promotion, however, is overall library visibility. When campus users log on to the network and see a message from the library, even if the information is not relevant to them at the time, it reminds them that the library actively exists and is available to them. The library information on the campus network reaches "a wide range of people

beyond the library, and not just those who come into the library. This is an essential part of promotion, i.e. getting to non-users" (Malley, 1985). By making the library a visible entity on the campus network, we are hopefully reaching not only regular users of the library, but non-users as well.

ISSUES TO CONSIDER

There are several issues to consider when discussing library use of the campus local area network. This paper describes what ideally could happen with the use of a network. Of course, individuals, for various reasons may not be reached through the network. We've seen many faculty, for example, who have a computer account, but never use it to even check their email. There are also those individuals who have an account, but don't have convenient access to a computer.

Finally, the library can't force anyone to read the messages posted to the network and unfortunately there are many who fall into this category of non-readers. Through NMSU-Alamogordo's Pmail system, there is even the option of turning off the system that notifies network users of new messages on the Noticeboards. Clearly, the library can only reach those campus users who have a need or interest in the information that we can provide. But, we feel that the benefits of having library information like this on the network outweigh the negatives. Most of the information provided on the network can be found in some print form in the library for those who are missed off the network.

Clearly, a campus local area network is a very useful resource to a library, providing unique enhancements to traditional services and resources. By utilizing the potentials available through a campus LAN, a library can have the opportunity to promote and provide services, present instructional material, and disseminate information through networked databases - to name just a few possibilities. This papers describes some efforts made by NMSU-Alamogordo Townsend Library, but we hope to make even more use of this valuable resource in the future. A library making the most of a campus local area network provides benefits not only for the library and its users, but for the entire campus.

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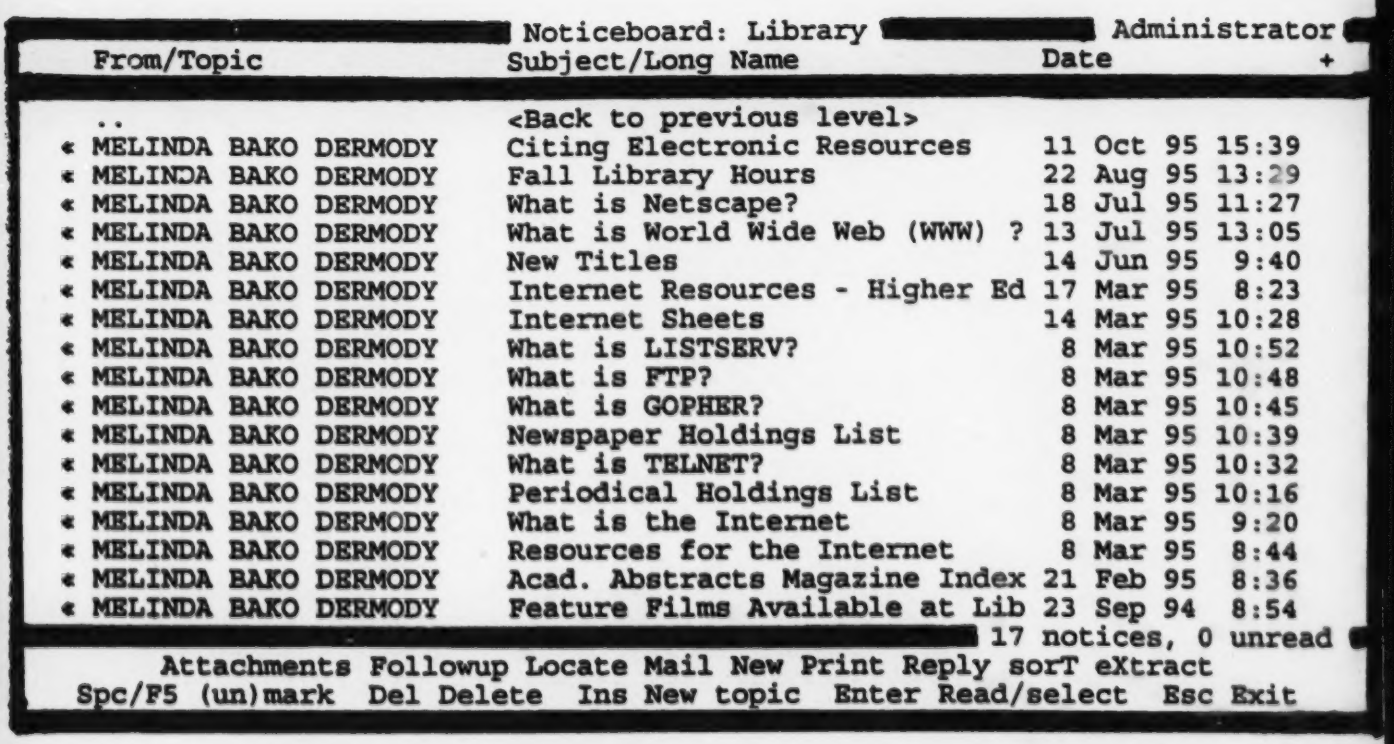
```
    12  General Bulletin Board
     6  Jobs through the Career Center
    11  What's Happening at NMSU-A
     1  Information from the Library
     2  Information From Student Services
     6  Faculty & Staff Discussions
     4  Financial Aid / Scholarships
    35  Clean Jokes Only Please
    10  Safety and Security
    10  Lost and Found
    10  Announcements from Phi Theta Kappa
Use pmail's noticeboard feature to read.

Strike any key when ready . . .
```

Example of the message notification on the Noticeboards.

```
From:          "MELINDA BAKO DERMODY" <NMSU-A/MDERMODY>
Organization:  Alamogordo Branch Community College
Date:          Wed, 8 Mar 1995 10:39:37 MDT
Subject:       Newspaper Holdings List
Priority:      normal

                    NEWSPAPER HOLDINGS


Alamogordo Daily News          1 month plus current month

Albuquerque Journal            1 month plus current month

El Paso Times                  1 month plus current month

Indian Today                   Current month

New York Times (Sunday Ed.)    1 month plus current month
                               Jan. 1970-present on microfilm

USA Today                      1  month plus current month
```

Example of Library Noticeboard message.


Noticeboard: Library
Administrator
From/Topic
Subject/Long Name
Date
..
<Back to previous level>
« MELINDA BAKO DERMODY Citing Electronic Resources 11 Oct 95 15:39
« MELINDA BAKO DERMODY Fall Library Hours 22 Aug 95 13:29
« MELINDA BAKO DERMODY What is Netscape? 18 Jul 95 11:27
« MELINDA BAKO DERMODY What is World Wide Web (WWW) ? 13 Jul 95 13:05
« MELINDA BAKO DERMODY New Titles 14 Jun 95 9:40
« MELINDA BAKO DERMODY Internet Resources - Higher Ed 17 Mar 95 8:23
« MELINDA BAKO DERMODY Internet Sheets 14 Mar 95 10:28
« MELINDA BAKO DERMODY What is LISTSERV? 8 Mar 95 10:52
« MELINDA BAKO DERMODY What is FTP? 8 Mar 95 10:48
« MELINDA BAKO DERMODY What is GOPHER? 8 Mar 95 10:45
« MELINDA BAKO DERMODY Newspaper Holdings List 8 Mar 95 10:39
« MELINDA BAKO DERMODY What is TELNET? 8 Mar 95 10:32
« MELINDA BAKO DERMODY Periodical Holdings List 8 Mar 95 10:16
« MELINDA BAKO DERMODY What is the Internet 8 Mar 95 9:20
« MELINDA BAKO DERMODY Resources for the Internet 8 Mar 95 8:44
« MELINDA BAKO DERMODY Acad. Abstracts Magazine Index 21 Feb 95 8:36
« MELINDA BAKO DERMODY Feature Films Available at Lib 23 Sep 94 8:54
17 notices, 0 unread
Attachments Followup Locate Mail New Print Reply sorT eXtract
Spc/F5 (un)mark Del Delete Ins New topic Enter Read/select Esc Exit

List of resources available on the Library Noticeboard.

OPEN INTERNET ACCESS IN A STRUCTURED SCHOOL ENVIRONMENT

"Controlling Chat Lines During Study Hall"

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ABSTRACT

The New Mexico Military Institute is a unique school in many ways. NMMI is a 4 year high school--2 year junior college with a strong emphasis on academic preparation and excellence, a strong student leadership program, and a highly structured student life. At 7:00 P.M. every weekday evening the entire student body is at a desk with open book ready for Night Study Hall. By 11:00 P.M. all students are in bed for lights out and sleep. At 5:30 the next morning they are up preparing for the day's activity.

Another unique aspect of the Institute is the campus network. The goal is a network tap on the desk of each cadet, faculty, or administrative staff. Last January, the Internet became part of the campus network. The Internet by design is an open structure with little or no control placed on access. This posed a serious problem at the Institute. What is appropriate for a 23 year old college sophomore may not be appropriate for a 14 year old high school freshman. How can the Internet be available to cadets at their desk, yet restricted based on time of the day, class, GPA, deportment, etc.?

Currently all cadet access to the Internet is through the VAX cluster by way of TGV's Multinet. Multinet provides eMail, Telnet, FTP, TCP/IP, Finger, Ping and SNMP. VMS freeware from various Internet sites provide other Internet utilities, Gopher, a Web client (Lynx), and Hytelnet. The cadet has access to a full set of Internet utilities while providing Computer Services' staff VMS protection and programming tools to control access.

NMMI Computer Services has programmed a security front end (based on VMS security features) to control access to Internet utilities based on time of day, day of week, student class rank, GPA, and deportment. It is also possible to restrict certain Internet capabilities (Telnet and eMail) on an individual basis. An Internet database (in POISE DMS format) holds all relevant data. Selected individuals may update the database on demand to change access restrictions.

PROBLEM

NMMI is 3 years into an ambitious project to provide network access to all cadets at the barracks desktop. Network access currently is serial access for PC's, Macintosh and terminals. TCP/IP will be available next year with completion of the Saunders project. Thanks to generous funding from the NMMI Foundation, cadets may lease terminals at nominal cost for basic network access. Currently 36% of the corps are active computer users with only one of the two barracks on the campus network.

The vision for cadet access sees the work station screen (PC, Mac or terminal) as a window into information systems, local and international. Menu driven interfaces provide cadet access to Institute data bases, general campus information, the campus on-line public catalog, a spreadsheet, text processing, email, and printing capability. Wide area access was added spring semester 1995 when NMMI joined CHECSNet and the Internet. Initial costs for the Internet connection are covered by an NSF grant administered by ENMU Portales. Cadet reaction to Internet access was enthusiastic, particularly email and chat lines.

A large percentage of cadets are from out of state and a significant number of cadet families have access to Internet. In addition a number of cadets have accounts at university computer centers around the nation. The enthusiasm was so high that some cadets were on the computer all night raising serious concerns among faculty and staff, particularly for high school age cadets. While the situation was viewed with alarm by some faculty and administrators, the Commandant saw the issue providing an excellent opportunity to teach responsibility. Internet access is not a right but a privilege to be earned and used responsibly.

COMMANDANT'S RULES FOR INTERNET ACCESS

During spring semester of 1995, meetings were held with the Commandant on the parameters to use in restricting cadet internet access. Chat lines and email during night study hall are the major concerns. The intent is not to block access to the Internet for use as a reference but to limit "chatting". Since most chat lines use Telnet for access, limiting Telnet and email were deemed sufficient. Even access to chat lines via Gopher or Lynx makes a Telnet connection using the foreign command TELNET. The Commandant established the following definitions for cadet access and published them in the Cadet Blue Book of Regulations:

A. No RAT (Recruit At Training) will have access to the Internet at any time for the first 3 weeks.

B. Upon completion of the first 3 weeks, RAT's will have access to Internet mail and Telnet during non-study hall times but will only have access to Internet for NSH.

C. Cadets on academic or disciplinary probation will be restricted from the use of Internet mail and Telnet during NSH.

D. Cadets with less than a 2.0 cumulative GPA or less than a "C" in deportment will be restricted from the use of Internet mail and Telnet during NSH.

E. All 4th, 5th, and 6th class cadets, regardless of status, will be restricted from the use of Internet mail and Telnet during NSH and from Telnet at all times.

F. All 1st, 2nd and 3rd class yearlings or old cadets will be authorized full access at any time unless they fall under paragraph c or d above.

A data file was created in the POISE DMS format and entry screens prepared. A sample screen follows:

Internet Restriction file - Commandant's Office

==========

Cadet Number _____ UserName ____ _____

Data from CMD$DATA:INFO

Cadet Data
Academic Class: ___
Cumulative GPA: ___
Status __
Probation
Academic: ___
Disciplinary: ___

	Restrictions	
	Full Time	**NSH Only**
Internet:	___	___
Mail:	___	___
Telnet:	___	___

Flag Fields in Cadet Internet
RAT (Y/N) ___
Commandant's Override ___

Restrictions above are set nightly based upon flags to the left.

Possible restriction flags are
blank = no restriction.
Y = cadet is restricted.
P = permanent restriction, added and removed by operator.

Each night a system procedure loads the cadet ID number and account username from the system authorization tables. It then loads data from the Commandant's information file into Academic Class, Cummulative GPA, Status, Academic Probation, and Disciplinary Probation. A short program then uses the flag fields just set, to calculate the restriction flags. If the restriction field currently holds a blank or "Y", a new value overwrites the old. If the restriction field holds a "P", no changes are made. Control of access restrictions is provided by another program.

COMPUTER CONSIDERATIONS

The Digital VAX VMS file protection scheme is based upon four groups of users (System, Owner, Group, and World). The System group is any system user or anyone possessing the privilege SYSPRV. The Owner group is the owner of the file in question. The group designated as Group is based upon the UIC (User Identification Code) of VMS. It is any user holding the same UIC class. The World category is any other user on the system.

Four possible access modes (Read, Write, Execute, Delete) are also available in Digital's file protection scheme. Read access allows the user to read the file in question. Write access allows the user to write to the file. Execute allows execute access to compiled images. Delete allows the user to remove the file from the system. Thus a typical protection mask is (S:RWED,O:RWED,G:R,W). System has read, write, execute and delete access as does the owner. Members of the same group have read access only and others on the system have no access.

An additional protection scheme is available within VMS through the use of ACL's (Access Control Lists). A system level user may create an identifier which is recognized by all levels of the file system. The system user then grants the identifier to a single user or group of users. It is analogous to a key to allow entry to the file system. An ACL is then placed on a file or device granting levels of access for holders of a particular identifier. The ACL is equivalent to a file lock granting access to holders of the correct key. ACL's provide a great deal of flexibility in granting access to various files.

Identifiers are granted within the user authorization process and are normally permanent qualities of a user account. A super user, one with the privilege CMKRNL, may however grant or revoke an identifier on the fly. This is the basis of the NMMI Cadet Internet Restriction procedure.

LOGIC OF INTERNET RESTRICTION SYSTEM

All cadets at NMMI have a computer account with username CADETnnnnnn where nnnnnn is the cadet's ID number. This allows utilities written at NMMI to read the username and from it parse the cadet's ID number. This in turn provides key access into the Institute databases. Each such account holds the identifier CADET as a permanent aspect of the account. Many programs, procedures, data files, and disks have the ACL

(IDENT=CADET, ACCESS=NONE).

This limits cadet access to the file system. A similar ACL is placed on all Internet utilities blocking cadet access. An additional identifier, INTERNET, is placed on all Internet utilities so that the INTERNET identifier precedes the CADET identifier. For example:

GOPHER.EXE;4 [SYSTEM,SIDERSB] (RWED,RWED,RE,RE)
(IDENTIFIER=INTERNET,ACCESS=READ+EXECUTE)
(IDENTIFIER=CADET,ACCESS=NONE)

The GOPHER utility has a protection mask

(S:RWED,O:RWED,G:RE,W:RE)

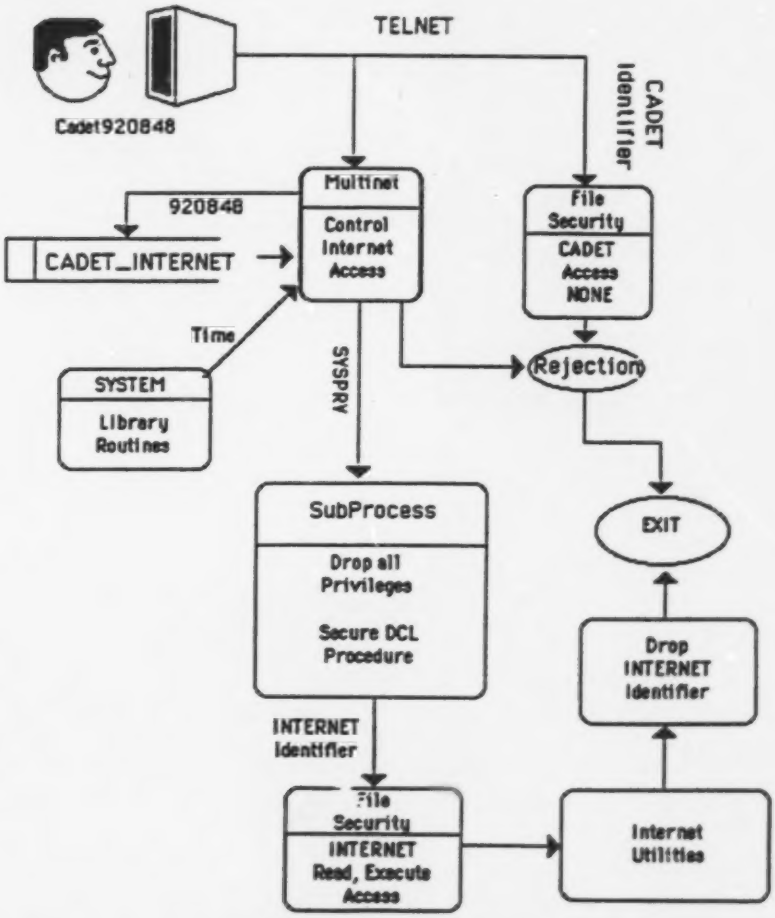
which allows anyone on the NMMI cluster to access the utility. Cadets however (holders of the identifier CADET) are restricted by that ACL. If the cadet is granted the identifier INTERNET, that ACL takes precedent and the GOPHER utility may be executed.

A BASIC program grants the identifier INTERNET to cadets under specified conditions. The program is installed with SYSPRV, SETPRV, and CMKRNL. SYSPRV allows access to files normally not available to the cadet. SETPRV allows the program to assume or drop privileges and CMKRNL allows the program to grant and revoke the identifier INTERNET. The program is defined as a foreign command and parses parameters passed at execution. That is, the command GOPHER is replaced by INTERNET GOPHER where INTERNET is NMMDISK:[MULTINET]MULTINET.EXE.

The program

- parses the passed parameters.
- reads system time and determines if its Night Study Hall.
- reads the Username and parses cadet ID.
- checks the data file for restrictions on the cadet.
- spawns a subprocess to execute a secure DCL procedure if appropriate.

The spawned subprocess drops all privileges associated with the parent process. The cadet executes the Internet utilities without privileges. If restrictions are in place on the cadet, a message is displayed informing the cadet of the fact, and the identifier is not granted. If no restrictions are in place on the requested utility, the program grants the identifier and spawns a subprocess to execute the secure DCL procedure. Since the program has SYSPRV it may execute the procedure where the cadet may not. Once the subprocess assumes control, privilege is dropped and the cadet executes the Internet utility via the ACL. This avoids the problem of allowing the cadet to execute an Internet utility like GOPHER, while holding exceptional privilege.



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Other Applications

The use of the cadet's username to arrive at a cadet ID number which in turn provides access to the tabled restrictions in the data file, is more an artifact of existing username structure than a requirement for this application. One could use the VMS account username as the key for the restrictions file as well. Rather than placing restrictions, procedure or program names and accompanying identifiers may be tabled in the data file. For example:

Username	Procedure	Identifier	Procedure	Identifier
SIDERSB	GYM-Billing	GDYBIL	AR-CleanUp	AR
TODD	GOLF-Billing	GLFSYS	GOLF-REG	GLFSYS

A use of VMS protection and ACL's similar to that above, will then provide read or write access to data files on a procedure by procedure basis. For example a user in one office may be granted an identifier allowing update of data files across data bases in several other offices; all in a highly controlled and transparent fashion.

INFORMATION SECURITY TRAINING

How To Educate Your Staff Without Having Nap Time

by: David Gresham,
Computer & Information Resources & Technology
University of New Mexico

Paper not submitted for publication

THE INTERNET AS A REFERENCE TOOL:

Accessing Scientific and Technical Information via the World Wide Web

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Los Alamos National Laboratory is located in northern New Mexico. The laboratory is a scientific research facility operated by the University of California for the Department of Energy. The Research Library, with its book and journal collections and, increasingly, its electronic access, supports the efforts of the laboratory research staff. The Research Library has developed a World Wide Web home page to allow laboratory staff access to information via the Internet. This page, while designed for laboratory staff, is not limited to them. Access is allowed to individuals from around the globe. Roughly one-half of the accesses to our Web structure come from outside the laboratory.

Many sites that have pages focus solely on information about their organization. At universities this is primarily information about the courses that they offer, homework assignments, and the faculty and their areas of research. Many libraries that provide links to subject information also primarily point to this type of information as well, except for in the general reference area where they primarily point to reference materials such as dictionaries, the periodic table, etc. At the Los Alamos National Laboratory Research Library we made the decision that these were not the types of links that we wanted on our subject pages. We make an effort to search the Web to find potential links that contain the same type of information that might be found in a library. We have access to reference type materials in the different subjects, electronic publications, directories, etc., as well as pointers to lists elsewhere on the Web that cover that subject. As we serve primarily the scientific community, most of the links we have made have been to scientific and technical resources. As we are a government institution we have also made links to governmental information. Other types of information include business and general reference.

The Research Library (http://lib-www.lanl.gov/) page has access to these types of resources by selecting the link 'Subject Resources'. The subjects that are listed on that page include general reference, astronomy, biology-genetics, business, chemistry, computer science, engineering, environmental, government resources, international affairs, Internet, legal resources, Los Alamos history, mathematics, nuclear information, physics, standards and regulations, electronic texts, and journal tables of contents. Selecting the topic of interest brings up a page with links to resources in the field.

As stated earlier, we try to make direct links to the relevant information. Following are a few samples of the information available from some of our different subject pages. On the astronomy page are links to the Nine Planets; a multimedia guide to the solar system, and Views of the Solar System which contains images and information about the sun, planets, comets, etc. in our solar system. The biology/genetics page has links to Morbidity & Mortality Weekly Report and to the Hazardous Substance Release/Health Effects Database. The chemistry page contains MSDSs for chemicals and the periodic table. The engineering page has links to the Thomas Register and to many companies' semiconductor data sheets. The mathematics page has links to mathematical constants and to several electronic journals. The physics page has pointers to physics Nobel Prize winners, conversion of units, and the table of the nuclides. Check out the pages to see all of the other information that we have made available through our server.

The Research Library is in the process of having all the Los Alamos reports starting with LA-1 scanned so that they will be available electronically. This is being done so that the laboratory staff and general public will have improved access to results of research done at Los Alamos National Laboratory. The URL for the reports is listed at the top of the detailed display of the record in our online catalog (telnet library.lanl.gov). New reports are received in an electronic form and are being made available through the Web in pdf (portable document format) through Adobe Acrobat. (The Acrobat Reader is available free on the Web from Adobe at http://www.adobe.com/./.)

The reports are of many different types. There is everything from the Institutional Plan and the annual Research Highlights to the more technical reports. The reports are accessed from the Los Alamos Publications page (http://lib-www.lanl.gov/la-pubs/la-pubs.htm) from the Research Library home page. The technical reports are listed under Los Alamos Reports but some are also listed under broad subject categories such as computing, environmental technologies, materials science, and physics. They are arranged by report number. The reports cover the entire spectrum of laboratory research. Some representative titles include Atlas of the Breeding Birds of Los Alamos County, Environmental Surveillance at Los Alamos During 1992, New Mexico, HIV/AIDS in the Workplace: A Positive Approach, International Technical Cooperation Program at Los Alamos National Laboratory, and Life Sciences Division and Center for Human Genome Studies 1992-1993. Some other titles include Measuring Human Brain Activity, Physics Division Technology Review, The National High Magnetic Field Laboratory, Nuclear Borehole Logging Applied to Environmental Restoration, and Shaping the Library of the Future: Digital Library Developments at Los Alamos National Laboratory's Research Library. We are presently working on making the bibliographic information keyword searchable.

There are many different ways to find information on the World Wide Web if the information is not found at familiar sites. There are many useful lists of sites as well as a number of search engines. Lists of pages have generally been compiled by one or more individuals and are physically located on one or more specific machines while search engine results do not exist until the search is requested. Lists are usually arranged by subject and then broken down into smaller subsets - either narrower subjects, by type of information, by source of information, or some combination of the above. Their hierarchical arrangement makes them ideal for browsing by subject to see what is available electronically.

Yahoo (http://www.yahoo.com/yahoo/) is a list that was started at Stanford University. This list is organized by broad subject (e.g., science, reference) and then by narrower subjects (e.g., agriculture, computer science, ecology, physics). Each narrower subject is further subdivided. Some examples of subdivisions in physics are atomic physics, conferences, institutes, journals, scientific constants, and Usenet. Each of these will take you to a further list with links to actual pages. Items are not limited to being located within one page of the structure. They may be found through several different routes. Using this hierarchical structure is one way to browse Yahoo. Another way is to make use of the search capability. After entering the search term(s) a list is retrieved which shows where in the Yahoo structure the match was found as well as a link to the actual match.

Search terms can be entered from the main page or the searcher can opt to change the options for more sophisticated searching.

Other lists include the WWW Virtual Library and Planet Earth.
The WWW Virtual Library (http://www.w3.org/hypertext/DataSources/bySubject/Overview.html) consists of subject oriented lists maintained at sites around the world. There is no consistency in the organization of each page from one sublist to another. The main list starts with broad subject categories which may or may not be further subdivided before directing the user to the information collected at another site. This list does not have a search option like Yahoo to search for specific information contained in the list.

Planet Earth (http://www.nosc.mil/planet_earth/info.html) contains two 'Science Rooms'. Room 1 contains sciences such as physics, mathematics, chemistry, and engineering while Room 2 contains anthropology, medicine, botany, and geology, for example. Subject pages generally consist of 'servers' and 'topics', however some subjects contain more categories as more information has been compiled in those areas. Physics is one area that contains extensive information. It is divided into the following eight categories:

- Specialized Fields in Physics
- Generalized Servers
- Specialized Servers
- Research Laboratories
- Physics Institutes
- Miscellaneous Physics Information
- Laws, Constants, Periodic Tables, Weights, Measures
- Physicists and Nobel Prizes

Planet Earth also has a way to search for information across the pages. It is not as sophisticated as that offered by Yahoo in that there are no options that the searcher can set. It also only indicates the page within the structure where the information can be found. One must then go to that page and search the page to find the search term.

Many other lists can be found on the WWW. The above are some examples of those with a strong science/technology focus. The best way to use these lists is to find one or two that work well for you and create bookmarks for those sites. Although links to most of the lists mentioned above can be found on the Los Alamos National Laboratory Research Library pages they are often to areas which reflect the scientific and technical interests of the laboratory staff so those whose interests are broader might do better to access them directly.

These lists, while being useful for browsing to see what is available in a particular field, are not comprehensive. They have been compiled by individuals from information that they have found or has been sent to them as a suggested addition to their page. If the needed information is not identified from one or more of these lists that does not necessarily mean that the information is unavailable via the World Wide Web. If unsuccessful with this avenue, try using instead one of the many search engines offered around the World Wide Web.

Search engines are different from the lists in that they go out and search around the Web rather than search locally mounted information. These are generally

DESIGNING THE ELECTRONIC CLASSROOM

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Why Electronic Classrooms?

In libraries, we have largely relied on one-on-one interactions with patrons and software demonstrations to groups to teach patrons to use our electronic resources. In large classrooms, the traditional methods of teachers have included the podium, overheads and transparencies. However, relying solely on these methods is no longer sufficient in an increasingly technological environment. Simply demonstrating software to a group of patrons will not make them *information literate*. It is the hands-on experience that transforms class content to mastery.

The basic lecture format in large classrooms has long been criticized for its impersonal nature and the tendency to suppress student participation. There is an emerging focus on the student-teacher relationship and the importance of collaboration in the learning process. Technology is being used to foster the "bidirectional" communication between teachers and their students. Librarians and teachers need to keep pace with these changing educational methods if they are to maintain an influential role in the learning process. Electronic classrooms can provide an environment for accomplishing this.

However, technology should not be added for its own sake. When evaluating the addition of an electronic classroom to your facilities, be sure to ask yourself, "can the goals for my classes be better accomplished using this technology?" If so, the following paper will provide you with a starting point for designing and planning your electronic classroom.

New Facilities or Renovations?

Begin by determining the specific intended uses of the lab as this requires specific considerations in the design process including location, furniture, hardware and software. Decide if it will be used for short instruction sessions, courses for credit, or computer resources for students, for example. It is also advisable during the earliest stages to either hire a consultant or involve others with expertise in the many specialized areas of facility planning, areas such as HVAC (heating, ventilation, air conditioning), computer systems, electrical systems and teaching with technology. Consider organizing a committee with representatives of interested groups, such as the computer center, physical plant or teaching faculty as they can provide insights and serve as advocates in the planning stages.

You will need 700-1200 square feet for the classroom to accommodate 20-30 computer stations. In older library buildings, bibliographic instruction rooms are often renovations of small, unused corners and were not designed with technology in mind. This is also true in many older teaching facilities. Consequently, if you are renovating, you will be limited by your own circumstances and the financial resources available for the project.

Traffic flow should influence the decision to renovate or construct a new facility. Electronic classrooms should be arranged with traffic at the rear. If possible, they should be close to the entrances of buildings so that students coming and going do not disturb other classes in session or, as in libraries, disrupt other activities.

keyword searchable but do not all function in the same manner. Some search just the titles of pages while others search the complete text of a page. Also, multiple keyword searches function differently across search engines. Some will 'and' terms together while in other systems the default option is to 'or' the terms. Different search engines search different pages as well. Some are subject oriented. These search engines are very popular and will often be busy. If one is busy, either try another search engine or wait a few minutes and try it again. All search engines work differently. Because of this, the best thing to do when using one for the first few times is to read the instructions before beginning a search. Otherwise, search results could be very different from what is expected.

Webcrawler (http://webcrawler.com/) was originally developed at the University of Washington and is now part of America Online, is one search engine. The terms are entered on a single line and the user is given the option to either 'and' or 'or' the terms together. The number of results to be retrieved can also be selected. If a plural is entered, Webcrawler searches the singular form of the word as well. It searches both the page title and the page content. The results are retrieved in a ranked order with the most relevant ones first. Page titles are listed with active links so the searcher can proceed directly to a page of interest. If fewer results are displayed than exist, the option is given to view the next set of results. The main search option is for browsers that support forms but Webcrawler also supports formless searching.

Lycos (http://lycos.cs.cmu.edu/), from Carnegie Mellon University, is another search engine. It searches the Web daily for sites and reindexes its database weekly. The service offers an interface for those with browsers that support forms as well as those that do not. The forms interface gives the searcher the chance to change the search parameters. The simple search mechanism provides the user with the link and a brief description of the contents of the page. Results are retrieved in ranked order. Ten hits can be retrieved at a time. With the forms option, the user can select the number of hits to view at a time (up to thirty) and the format in which to view the results, either with or without the page descriptions. In either option, the user can request to view the next set of results.

Yahoo maintains a list of search engines. The list is titled 'Searching the Web', which can be accessed through the 'Reference' heading or through the 'Computers and Internet' and then 'World Wide Web' or directly with its URL (http://www.yahoo.com/Computers_and_Internet/Internet/World_Wide_Web/Searching_the_Web/). There are over one hundred options listed offering a wide variety of services and functionality. There are subject specific choices, across the Web options, and other services such as yellow pages.

The Los Alamos National Laboratory Research Library has endeavored to make the World Wide Web a vital tool for serious scientific researchers. By searching out and linking to the growing amount of scientific information available via the Web we are bringing many of the reference materials our researchers need directly to their desktops. We welcome scientific researchers whose fields overlap those at the laboratory to make use of the information we have provided and invite other research librarians to study our pages when designing or updating their own. Suggestions for improvements or useful links can be addressed to lib-info@lanl.gov.

Building Codes & Standards

For a bibliography on the codes and standards applicable to electronic classroom design, see Clabaugh, et al. (1993). Often, it is ADA standards which prompt questions. According to the standards, "accessible and reasonable accommodation is mandated in new construction and facility renovation unless the cost of the addition or renovation becomes an undue hardship." (Duggan, 1994, p.25) *Undue hardship* is difficult to define but may be understood as constituting a portion of the budget so significant that completing the project with the remaining resources is impossible. If the same resources are available in other locations in your institution to people with disabilities, you may not be required to meet all ADA specifications (Duggan, 1994). You can consult the Uniform Federal Accessibility Standards (UFSAS) or the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for specifics. Also, there are often state mandated codes to which facilities must adhere.

Certain basic features will facilitate access by persons with disabilities. For instance, there should be at least a 5 foot diameter space within the classroom so that wheelchairs can be turned. You may also decide to equip the lab with Braille signs, optical character recognition apparatus, oversized keyboards, joysticks, or assisted listening devices. To foster a learning environment for the visually impaired, choose high-contrast colors and moderate lighting levels.

Some general room standards will be helpful for facility planners in the early stages. If the room will have a capacity of 50 people or less, one door is sufficient. It should have a shatter resistant, tinted glass panel so that no one is injured if it unexpectedly swings open. Doors should not open into the primary flow of traffic. In fact, they should be recessed if into the room if possible. Doors with levers as handles are easier for disabled people to manipulate than doors with knobs.

Air flow and air conditioning requirements are influenced by the ceiling's height. A ten foot ceiling is sufficient in a room designed to hold up to 20 students. For rooms with 20-50 person capacity, plan for a 10 foot ceiling. Larger rooms may require a distance of 12 feet.

Windows should be at the sides of rooms, not the rear or front. Window treatments should block out light and may include venetian blinds, roller blinds, or drapes. If the room will not have windows, you should choose interior finishes and decor carefully so that it is visually appealing and conducive to learning.

Outfitting the Lab

Furniture

Desks: Labs are generally designed for 25-50 people with one or two students to a desk. If your classroom will have two people per computer station, make sure the chairs fit completely beneath the stations. The recommended standard height for desks is 29"-30" but some assert that the best height for using a keyboard and mouse is between 24"-26" (Duggan, 1994). Leg room should be at least 24" and surface space is optimally between 22"-30". Desks should have

extended sides and should protect wiring. Cases for disk drives should provide for ventilation and have holes for cords and cables.

Some desks house monitors horizontally, within their tabletops. While this provides more space for note-taking and an unobstructed view towards the front of the room, it may also be prone to glare and difficult to read.

The instructor's station should include the following components: desk, computer stand, monitor stand, and shelves for software and other materials. Task lighting is a useful item allowing the instructor to read notes at the station when the rest of the room has been darkened.

Desk Arrangements: Desk arrangements are largely a matter of teaching style. Planners are encouraged to consult with teachers who will use the facility and to visit other sites during instruction in order to weigh the pro's and con's of various options. A popular configuration is the lining of desks along the perimeter. The advantage to this design is the greater space for traffic flow at the center of the room and the ease with which instructors can walk the room to examine student work. Often, long tables at the center of the room provide additional workspace for students. The disadvantage with this arrangement is that students can not see the instructor without turning away from their monitors.

Traditional forward-facing rows let students watch instructors at the front of the room However, the monitors, unless they are the tabletop type, will obstruct their views. While this facilitates note-taking, it does inhibit traffic flow as students move in and out of their computer stations. Lastly, it is difficult for the teacher to monitor student work while presenting at the front of the room.

Variations on these designs allow planners to utilize limited space and still create effective teaching environments. Horse-shoe or u-shaped seating schemes, double oval schemes, desk cluster schemes, and v-shaped schemes are also possible.

Other labs use a variation on the periphery scheme, placing standard desks in rows at the center. This allows for traditional lecture in the middle of the room followed by hands-on practice on computer stations at the perimeter.

Chairs: Rooms with a capacity under 50 should have movable seating, 10% of which should be offset to the left for left handed people, 4% of which should be wheelchair accessible (Clabaugh, et al.,1993). Armless swivel chairs, adjustable for height and back support, should have casters appropriate for the surface, either tile or carpet, on which they will roll. Using the 0-1-2-3 padding guide will allow you to chose the best chairs for their intended use: for short durations, no padding is required; for 30-60 minutes, use chairs with at least 1" of padding; for periods of 1-2 hours, chairs should have 2" for adequate comfort; anything longer warrants 3" of padding (Coburn, as cited in Duggan, 1994).

White Boards and Screens: Some people experience a chemical sensitivity to the ink pens used on white boards. However, they are still preferable to chalk boards since the dust from the latter can damage hard drives and other equipment. Select a board with a white matte finish to minimize glare and maximize the angle at which the screen can be seen in the room. Beaded gain and lenticular screens

offer brighter images. However, the trade-offs are their narrower viewing angles and potentials for hot spots. Chose these screens when ambient light will be difficult to eliminate.

Keystoning, or the trapezoidal appearance of images on screens, can be fixed with the adjustable bases on many projectors. If this is not a feature of the unit, you can pull the bottom of the screen outward from the wall. However, while it is sufficient for computer generated images, this approach will distort video images.

Lighting

You should be able to darken the area around the video screen almost completely. In fact, some projectors require a completely darkened room for satisfactory image quality. This, however, makes it difficult for students to take notes. Zoned dimmers are the ideal solution, but they are also the most expensive. A compromise requires positioning some incandescent lights among the florescent ones, so that when the latter are off, there is still light for note-taking. Over seating areas, lighting should generally fall between 50-60 ft. candles and be reducible to 5-10 ft. candles. In labs where there are 50 or more students, extra lighting of white boards at 75 ft. candles will facilitate viewing from the rear of the room.

Walls

When choosing finishes, consider their reflectance values. These can be ascertained from charts and product samples. Since it is possible that items such as chairs and carts may bump walls, you will want to choose finishes for their durability as well.

Acoustics

The Sound Transmission Coefficient (STC) for the lab should be no less than 50 so that students can hear over the hum of the computer equipment, HVAC systems, and other building noises. Carpet will improve acoustics, but static electricity can be a problem in drier climates. While some spray carpets with a carpet guard or fabric softener to combat static, others purchase static-free tiles or linoleum and accommodate for noise by using acoustical tiles in the ceilings. Lab location is another important way to insure acoustical quality of the room. Make sure the lab will not be located near an elevator and that printers are placed in recessed areas or covered.

For larger rooms, you may need to use sound systems. These typically include a microphone, an amplifier, and an equalizer. Some teachers prefer radio microphone systems that allow them to move freely about the room. Another alternative is the cardioid microphone that is suspended from a boom over the instructor's station.

Environmental Controls

Air circulation rates, temperatures, and humidity all need to be controlled for computer functionality and human comfort. An American Society of Hearing, Refrigeration, and Air-conditioning Engineers' (ASHRAE) standard determines the adequate number of air changes per hour for a room. Many recommend ceiling fans in addition to HVAC systems to keep the air moving, especially in smaller classrooms. The temperature should fall between 50-70F degrees, with an optimum temperature for hardware at 65-75F. Humidity levels can range form 20-80Fand will be optimum at 30-50F (Moran, 1987).

Accessories

Other items may be purchased for the lab depending on the type of instruction you intend to conduct there. For instance, in extended classes, footrests, copy holders and task lighting may be useful. Racks for promotional materials, a phone for reporting problems, trash containers, and exit signs are all accessories that should be considered for any lab.

Electronic Equipment

LCD vs. CRT Projection Equipment

The quality of the projected image can ultimately enhance or diminish the overall effectiveness of the lab as a learning environment. Therefore, you could consider the two options, cathode ray tube (CRT) and liquid crystal display (LCD) carefully when choosing a projector. What follows is a summary of some important considerations for making that decision.

Motion Video: Motion video projected through a CRT tends to be more uniform and more resolute than motion video through some LCD units. Ensure that the unit's pixel response time is less than 50 milliseconds for both motion video and computer animation applications. At response times greater than 75 milliseconds, mouse pointers will fade from the screen. Some LCD panels can have rapid pixel response times and display computer animation well, but may not support the National Television Standard Code (NTSC) for video images.

Portability: LCD panels are simpler to set up and more easily transported compared to bulkier CRT projectors which require *convergence adjustments* when they are moved or fall out of alignment. For ceiling-mounted CRT projectors, a ladder is needed to make modifications.

Image Quality: CRTs generally produce brighter images and are more effective in larger rooms or rooms which cannot be fully darkened than LCDs which rely on overhead projectors for light sources. The unit of measure for the brightness of video projection systems is in *lumens* but can be assessed in different ways. The resulting values cannot always be compared. Unless the rating method is listed as American National Standard Institute (ANSI), it is best to test equipment to compare actual brightness. Overhead projectors chosen for use with LCDs should cast between 2,700 and 3,000 lumens (Griffon and Robinson, as cited in Conway, 1994).

Active matrix is a newer technology used in CRTs for more rapid response and higher contrast in color displays. Additionally, CRTs can have either *fixed* or *variable convergence lengths*. The former indicates that the image always appears at a fixed distance from the projector. Consequently, the screen must always be positioned at the same distance from the projector and the image size cannot be varied. In CRTs with variable convergence lengths, moving the projector forward and backward reduces and enlarges the image on the screen.

Another important consideration for CRT units is the range of *scanning frequencies* the projector can accept from the computer. Different computers and video equipment have different scanning rates. One convenient alternative is a multi-scan video projector that automatically adjusts to the correct frequency from the computer. Projectors with lower frequencies can be adapted for use with higher frequency computers by attaching a converter that lowers the signal to the projector's range, but the image quality and resolution capacities of the computer will be diminished in the display.

Cost: LCD panel and overhead projector are generally priced between five and seven thousand dollars while low-end CRT projectors start at nine thousand, a price that does not reflect the cost of installation. The choice between LCD and CRT technology should not be made simply on the basis of cost, but with regard for how and where it will be used.

Rear vs. Front Projection

Rear projection allows the positioning of a teacher in front of the screen without blocking the image projection and is effective in rooms where ambient light can hamper image clarity. However, the appropriate distance of the projector to the screen must be allotted or mirrors and lenses must be carefully utilized to duplicate the distance. Rear projection systems can be purchased as single units to avoid using extra space or mirrors, but they tend to be bulky and do not enhance the 50% viewing angle generally afforded by this type of projection system.

Front projection tends to offer a wider viewing angle if appropriate screens are used. Also, computer-generated text will be brighter and have greater resolution. Some front projection systems can be mounted from the ceiling to maintain an open path from the projector to the screen. It will not be necessary to climb a ladder for making adjustments if a unit with a remote control is purchased.

Regardless of the direction of projection, the distance between the farthest viewer and the screen should be no greater that six times the screen width. Some recommend reducing the distance to no more than four times the screen width. They anticipate that changes in projection technology will advance more sophisticated applications of electronic projection (Clabaugh et al., 1993) and, presumably, produce images with levels of detail that can only be appreciated at closer distances.

Integrated Control Systems

Integrated control systems can facilitate the use of various projectors, videocassette players, computers and lights from the instructor's station. These can be either configurable software, such as AMX, Video Director, or Creston control systems, or can be programmed microcomputers which display a series of menu choices when the instructor begins. Much of the software allows instructors to set up individual profiles they can reuse later. A system now being marketed by Extron has been designed to "control all room technology functions and to provide a Knowledge-Based Help System that automatically pages a technician when help is required" (Conway, 1994).

Monitors

Studies on emission rates from video display terminals (VDTs) have not confirmed health risks, but some researchers have suggested that exposure to extremely low frequency (ELF) and very low frequency (VLF) radiation may cause diseases such as leukemia and brain tumors. Monitors should emit no more than 2.5 milligauss (measured by a gaussmeter) at a distance of 20 centimeters. Since no official standard exists at this time, many computer manufacturers conform to this guideline, established by the Swedish National Board for Measurement, known as MPRII. (McKimmie and Smith, 1994). "[Emissions] are especially significant in laboratories where 20-30 machines are in use at one time. Wise administrators will investigate available research and standards concerning these waves and work to mitigate their effect." (Ross, 1992)

Wiring

Two types of wiring will be necessary for the lab: network cable and 110 volt alternating current wire. Lay network cable so that rooms need as few feet as possible since increased distances between computers and servers slow data transmission and often necessitate additional equipment to enhance efficiency. Networks should not be located in high voltage areas. Sensitive ethernet cables will be best protected beneath the floors, though sub-floor utilities are costly and difficult to access for maintenance. Raceways, conduits, and boxes fastened to the floor create uneven surfaces and make moving equipment troublesome. Locating wiring within the walls is most preferable.

An adequate number of outlets, mounted 18"-24" inches from the floor, should be available in the lab. It has been suggested that an additional 20-40% be added to accommodate for future needs (Clabaugh, et al., 1993). The lab should withstand the simultaneous start-up of all machines. Dedicated lines are essential for servers and other heavy equipment, but are not required for each computer (Ross, 1992). Include several circuits, one for the instructor's station, one for each group of ten computers, one for overhead lights, one to turn all student monitors on or off at once from the instructor's station, and extras for expanding as needed.

Provisions must be made for power spikes, brown-outs, and black outs. It is not enough to simply equip each circuit with a breaker since cutting the power

instantly can cause information loss or disk damage. *Surge protectors* can diminish risks but most systems designers advocate using a UPS (Uninteruptible Power Supply) despite higher costs that range between $300 and $2000. One UPS will serve up to ten computers and will direct power to them during a brown-out. In the event of a black-out, it can keep computers running up to 30 minutes, furnishing time to save work-in-progress and shut down the system (Landt, 1995).

Software

"Lecturware" that facilitates the "bidirectional" flow of communication is being increasingly incorporated onto teaching strategies. This software allows students to ask questions or respond to questions anonymously to their instructors and see the screen image on any screen in the classroom at their own computer station. With some software, teachers can turn off students monitors which may help direct their attention to the instructor at key times. Instructors switch from a computer monitor to the overhead projector, VCR, or a live video camera focused on a real object such as specimen, for example.

It is important to consider the number of simultaneous access points allotted by software licenses so that all students can access the same software together. It is also advisable to keep back-up copies on disk, and for libraries, to have a CD-ROM drive available in case the network goes down during the presentation.

Security

There are six categories of risk to the electronic classroom: fire, disaster, theft, vandalism, copyright, and virus. For fire protection, supply labs with appropriate extinguishers, not water or powder based since these cause extensive damage to computer equipment. Smoke alarms that also register humidity and temperature are good preventative measures. A fire door to last for 2 hours is recommended. Strategies for disaster prevention will vary depending upon the region, but may encompass measures against earthquakes or floods, for example.

Several precautions against theft are available. Steel cables, electronic cables, and alarmed power strips are some examples. A simpler method is to engrave hardware with an identification number. A more difficult form of theft is the cracking of hard drives and removal of expansion boards, video cards and other components. For protection against vandalism, you may decide to invest in more extensive security measures such as alarmed doors and windows, video cameras, motion detectors and card-key systems.

Copyright restrictions are difficult to enforce, but it is important to show a good faith effort towards restricting improper use of licensed resources. Signs should be posted in the lab explaining the users' responsibilities for knowing and complying with copyright restrictions.

Viruses can be easily combatted by ensuring that each CPU have a virus checker which cannot be disengaged when users boot the system.

Estimating Costs

Costs will vary greatly but should factor system support and training expenses. You may choose one contractor for the entire job or may contract to several with expertise in specialized areas. Take advantage of contractors that offer free site surveys when estimating costs. Some of the variations in cost will be due to the types of ceilings, location of cable, and the ease with which components can be hooked up. Also, ask about educational discounts and warranties. Be cautious as warranties may or may not include parts, labor, or temporary replacements.

Establish a plan to cover maintenance and replacement costs. Some institutions are now applying the concept of "life-cycle funding," formerly used with interior furnishings, to equipment. It may also help to create a schedule to resell equipment around the 3-5 year mark in order to realize the maximum benefit from initial investments (Clabaugh et al., 1993).

Managing the classroom

A policies and procedures statement will facilitate classroom management. It should include instructions for scheduling classrooms, providing access to classrooms, and standards for software and hardware support. Early training strategies to assist faculty in making the most of the room's capacities should include an orientation to the basics such as how to boot the system, use the lab according to policy, handle problems with the facility or equipment, find supplies, and use the integrated control systems and application software. Strategies for integrating electronic technologies into the classroom environment is essential for the successful adoption of newer teaching approaches.

Administrators should devise a maintenance plan, a trouble-shooting guide, and an inventory list. A small stock of replacement parts kept nearby can reduce downtime of equipment in the lab.

Promotional campaigns should be utilized to announce the opening dates for the new lab and its services. Publishing a regular newsletter has been an effective method of publicity for some and may assist in enhancing your facility's visibility within the institution.

The impacts of the new classroom should be anticipated. Usually, instruction programs will become stronger and demand for the services will rise. This in turn increases the resources required to sustain the programs. You may find that you have you have met the challenge of designing the electronic classroom so well that you are now challenged by its success!

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LEVERAGING CAMPUS NETWORK CAPABILITIES AT THE DESKTOP

Helping Users Get Real Work Done

or

How Windows Sockets & MacTCP Changed My Life

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BACKGROUND

By 1994, UNM's fiber optic network backbone reached 110+ buildings. Building LANs were being constructed rapidly. Computing center staff were installing network software (Clarkson Telnet and network middleware) nearly 200 times a month. Unix system accounts more than doubled to 17,000 by early 1995. Information Superhighway publicity and user pressure for Windows and Macintosh WWW clients such as Mosaic and Netscape reached a crescendo.

UNM was ripe for a move from the Clarkson Telnet VT terminal emulator to TCP/IP clients running on desktop machines using a GUI interface for a variety of reasons:

- Computing center staff could not continue to install Telnet by hand, given the sheer number of new nodes being added to our campus network.
- A significant number of Macs and DOS/Windows PCs powerful enough to run multiple GUI network applications had appeared on desks throughout the university.
- System wide services and tools were in place that could benefit all users, if desktop-based service clients and supporting applications could be deployed.

COLLABORATION

Through a process organized by CIRT(1), stakeholders including computing managers and staff from Financial Systems, the Health Sciences Center, the General Libraries, and CIRT were involved in deciding on the goals of a project to replace Telnet with a suite of network middleware and productivity software. Staff from each area assisted in selecting and testing software for both platforms, Windows PCs and Macintoshes.

CORE NETWORK APPLICATIONS

Distribution of network productivity software was selected as the primary goal of the effort. Elements to be included were:

- A multiplexed TCP/IP stack (e.g. Winsock or MacTCP)
- An e-mail client
- A VTxxx terminal emulator, with minimum VT102 support and competent key mapping capability. Though some departments need VT420 emulation, this may not be provided initially.
- A TN3270 terminal emulator
- An FTP client
- A USENET newsreader
- An LPR spooler

Additional clients, such as gopher and WWW browsers were not viewed as critical components at the outset. The focus was on easier access to the tools used daily by most campus network users.

CIRT staff and student employees, and staff from collaborating departments joined the project team with these responsibilities:

• Selecting Desktop TCP/IP Clients: The first order of business was finding a subset of all the rapidly proliferating products appropriate to evaluate and making tentative selections, contingent on funding, of course. Our initial review did not make any limiting assumptions: We looked at commercial suites, stand-alone commercial products and at the shareware and freeware products as well.
• Documentation Review: Online and print documentation and plan for additions, including modifications to site-specific documentation and to installation instructions. CIRT's Publications Group already produces an Internet 'manual' to assist the university community in its use of the major Internet services and to support CIRT staff who teach a non-credit introductory Internet class. This and a large number of shorter publications are being revised to include information about the use of desktop clients.
• Network Performance: Testing network and dial-up PPP performance of the client software. Staff from CIRT's Networking, Systems and Information Resource groups are participating in tests to confirm that the desktop TCP/IP clients communicate acceptably with various servers across our network. Additional work to determine the best performance that can be achieved across a PPP(2) connection is underway as well.
• Automated Installation: Design a self-installing package for the networking software and client applications, ending most hands-on software installations.
• IP Number Assignment: An unavoidable consequence of automated setup is that clients will need quick and easy assignment of IP numbers and easy access to other network information. IP assignment must either become a user-accessible, highly responsive service or the campus network must transition to an automated IP configuration service. In UNM's case, the immediate solution is that IP assignment is moving to the user services area currently responsible for user-id assignments. Plans are underway to automate the service, ultimately providing a direct user interface.
• Software Licensing and Distribution: CIRT's contracting officer and software distribution manager are involved in contractual and distribution issues.
• Pre-configuring the TCP/IP Client Software: Ease of installation and immediate functionality required making modifications to the initialization files of most client software to customize it for our campus environment.
• Plan a Configuration for Pods (Campus Computing Labs): Many students access CIRT TCP/IP services via workstations in our pods. Work to configure these stations, without saving individuals' personal data, including passwords, mail, etc. is ongoing. Likely solutions include requiring users to keep configuration files on a floppy disk or making initialization files read-only and pointing to the floppy drive for default storage.

SERVICE AND PRODUCTIVITY GAINS

Early on I determined that an opportunity existed to improve user service *and* decrease hands-on work by CIRT staff if elements of the proposed suite could be well integrated with the Windows or Macintosh user interface and UNM's networked computing environment.

Products Selected

Let me jump ahead by quickly listing the products selected for our first release of UNM's Windows/PC suite of desktop TCP/IP tools(3):

- TCP/IP stack: Trumpet Winsock ver. 2.0
- Electronic mail: PC-Pine/Winsock, though Simeon and Z-Mail are still under review.
- VT terminal emulator: WinQVT/Net
- TN3270 terminal emulator: QWS3270
- FTP client: WS_FTP
- USENET newsreader: Free Agent
- LPR spooler: Windows LPR Spooler (WLPRSPL)

Selection Issues

Very early in the selection process it became clear that many of our product decisions would not be difficult.

We reviewed several commercial suites(4) and quickly found that all had both very attractive elements and, more importantly, dramatic flaws: High cost per seat; inclusion of too many client applications, including both ones we did not wish to support and others of limited functionality; and either clients we did not desire or lack of support for protocols to which we are committed.

Review of individual products was more valuable. Programmers with long-time access to the Internet at academic and military institutions have produced a number of excellent tools. Some are free to educational institutions, others have free- or shareware versions, with fuller capability available in the licensed version. The FTP and TN3270 clients we selected, WS_FTP and QWS3270, are truly excellent (academic) freeware. WS_FTP has the best interface for FTP we have seen and integrates into Windows very thoroughly. Free Agent, a newsreader, is also free to educational institutions and extremely fast.

We chose to license Trumpet Winsock because it offers equivalent support for both direct network connections and for PPP dial-up connections, including Password Authentication Protocol (PAP) support.

We chose WinQVT/Net as our VT terminal emulator because it is reliable and fast. It's licensed version allows storage of keymaps, linking keymaps to a specific configuration, and re-mapping on the fly. We expect to shortly move to a new version which will support VT-3xx immediately and VT-4xx shortly(5).

LPR spooling to multiple CIRT-operated system printers is offered with Windows LPR Spooler (WLPRSPL) ver. 4.0(6). It fully integrates with the Windows Print Manager and so is available from all Windows applications. It allows for multiple spools to various system printers and can correctly handle the Control-D issue for Postscript printers.

Selection of an electronic mail client has been the most difficult issue. An important, and difficult, decision was made to commit to Interactive Mail Access

Protocol(IMAP) as the mail transfer protocol to be supported by the client software we were selecting. IMAP has important capabilities, but since the protocol is newer, the clients are far less mature that Post Office Protocol (POP) clients.

A decision is still forthcoming at the time of this writing. PC-Pine/Winsock(7) is likely to be chosen for our initial release: It is academic freeware and requires essentially no instruction as Unix Pine is our current supported mailer. However, in its current form, PC-Pine is not a true GUI-based application. Nor does it offer a Macintosh version.

Two other serious contenders, Zmail(8) and Simeon(9), offer Windows, Macintosh and X-Windows version. This is extremely attractive. But for the moment, each has major drawbacks. Z-Mail's current version 3.21 is POP-based and has a limited address book function. Z-Mail's developer has committed to add IMAP support by March 1996. Z-Mail has a really flexible, powerful Windows interface and has long been widely used in corporate settings committed to Internet standard e-mail.

Simeon is a newer product, originally based on the Washington Pine code. It is completely GUI-based and includes direct support for IMSP (Interactive Mail Support Protocol) and X.400 address books, as well as Usenet newsreading via an IMSP server. ESYS is part of a group that also develops enhanced servers. All its products conform to Internet standards.

Each product we examined has been through multiple development generations in the course of our review. I expect that we will review e-mail clients again during the year following initial release of our suite of tools.

It is worth noting that nearly all the developers of these TCP/IP tools have been extremely responsive to our comments on needed changes and improvements as we tested their products.

Automated Installation Produces Significant Gains

Automated installation promises to be one of one of the most productive parts of the entire effort for CIRT. I reviewed the trade press and checked which packages are used in several major commercial applications whose installation flexibility I appreciated. As a result, I selected Stirling Technologies' InstallShield for Windows for our use. InstallShield, which also has Windows NT and OS/2 versions, provides a very rich set of tools to build auto-installation disk sets which will run from Windows(10).

The staff member developing our automated setup decided to build auto-installation packages for two packages we already distribute freely to the university community, MS-Kermit and Clarkson Telnet. While we distribute MS-Kermit from our Help Desk and campus computing labs (pods), Telnet and the underlying networking middleware(11) has historically been installed on all university workstations by staff from my division at CIRT.

Within two weeks a working configuration was being tested during our installation appointments. Although it is not yet finalized, we have already begun to provide the Telnet auto-install disk to departmental computing contacts for their use. By Fall 1995 we expect to be entirely out of the business of installing Telnet for the general university population. Similarly, MS-Kermit will also be auto-installable for those clients who running MS-Windows 3.1 or better. Recovering our time alone represents a huge savings. The ease of installation also means we can afford such extras as routinely setting up Windows icons for Telnet.

Distribution Options

Since an automated install package can be constructed, new distribution methods may be available as well, further lightening our workload. Possibilities being pursued include:

- acting as "wholesaler," producing shrink-wrapped packages with a new disk duplicator and an existing document printer and having the university bookstore sell the suite; and
- creating an "internal" FTP site, accessible only to those with UNM computing accounts, for distribution of this and other site-licensed products, as well as updates and fixes.

Impact of Licensing Issues on Productivity Gains

A significant contracting effort is required because of the number of vendors involved and because of the desired goal to offer the same suite of products for use by all faculty, staff and students on campus, at home and while traveling. Counting and reporting on license numbers is a bookkeeping task we hope to avoid. And, highly varied license arrangements could further complicate the task. Contracts modeled on WordPerfect's, which permits home or portable use as long as no more than one copy is used at a time, resolve most issues for faculty and staff.

Distribution for students is more problematic. As a state university, UNM is limited by the New Mexico constitution's "anti-donation" clause, which does not allow use of state funds for private benefit. Vendors also have a reasonable interest in selling licensed software to former students, once they leave the protection of a university site-license agreement. Approaches that we are taking include seeking overarching site licenses based on a good faith estimate of numbers of likely users and not requiring counting and reporting license numbers. Additionally, we have proposed an arrangement to vendors in which our software distribution staff would publicize the availability to departing students and staff of significantly discounted personal copies of software. Several vendors have expressed interest in such an arrangement.

Site-Specific Implementation

A significant early effort went into modifying the initialization files for the various applications. We created UNM-generic versions to provide common functionality to all the users of our suite of tools. For example, we configured

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the e-mail clients to point to the UNM central mail service and, via IMAP, to mail folders stored in each user's Unix filespace. This ensures that users of UNM's mail service see the same collection of mail, regardless of how they connect to the service. Our FTP client has a pre-configured collection of pointers to our own FTP site as well as those of the software vendors whose products we support; finding a new (or out-of-date) printer's driver for WordPerfect or Windows becomes trivial.

I believe the greatest productivity gains for UNM's users of our suite of network tools will come about as it becomes relatively trivial to share files via MIME attachments. Collaborative writing and submitting of homework via e-mail are commonplace with desktop tools in place. Experience with tools implementing MIME led me to recognize the need for an additional supporting component of our suite, file viewers and compression tools.

TESTING AND INTEGRATING SUPPORTING SOFTWARE

Selecting file viewers and compression/decompression utilities became a significant part of the effort. Though not anticipated in the original project definition, daily use of desktop networking capabilities had some important implications:

- users will try to utilize MIME services;
- users need to easily access (view, print and save) files they receive regardless of the originating operating system and application; and
- tools for viewing, printing and saving must integrate with network applications.

Handling MIME Attachments

Existing Internet standards and clients implementing them now make this a realistic goal. After collecting and configuring many graphics, Postscript and MPEG viewers available on the Internet, I chose to seek a single viewer product that would view and print most graphics, spreadsheet, database and word processor formats from both Macintosh and PC worlds. Configuring an automated installation to seek existing software on each computer and point to it for file viewing is not practical. Nor is adding a large number of individual viewers and keeping them updated as new file types proliferate.

Two commercial viewers are serious contenders: Keyview(12) and Outside In(13). Both can be the recipients of a MIME-pointer from e-mail clients. Both products integrate into the Windows File manager as well. Since Outside In is currently available for both Windows and Macintosh platforms, it is the obvious favorite(14). Site licensing negotiations with both vendors are ongoing at this writing.

Handling Compressed Files

Files of all types are generally accessible on the Internet in compressed form, saving both time and bandwidth in their transmission. Thus it is sensible to provide users with a method of viewing, extracting *and creating* compressed

files that is well-integrated with their working environment. WinZip(15) can serve as the viewer for received compressed files, integrating with e-mail and FTP clients as well as into the Windows File Manager. WinZip allows for viewing compression file contents via a built-in ASCII viewer, applications designated by Windows file associations *and* by a viewer program such as those discussed above. WinZip recently added support for a number of common Unix compressed file types (.GZ, .Z, .TAR, .TAZ, .TGZ) as well as all the major PC compression types. Creation of compressed files is also comprehensively supported. Licensing discussions are underway.

ADDING VALUE FOR USERS, GAUGING COMPUTING CENTER IMPACT

It is worth saying a bit about the work remaining to be done to extend the value of this project and about its impact on network and computing center services. Well-planned, global and/or departmental address books are clearly a service that users will demand. Improvements to LPR spooling are being implemented now, including a canonically named print server to provide lpr queues to all desktop TCP/IP users. Additional TCP/IP applications (such as gopher, WWW, CSO and WAIS clients) will be pre-configured for our environment, and distributed via our FTP sites, thus allowing users to extend their capabilities independently.

After several months of using desktop TCP/IP services, some of the likely impact on the existing servers becomes clear. Huge growth in demand for disk space on the mail server can be expected, due to the increased number of users and ease of use of MIME attachments. On the other hand the rate of increase for use of Unix NFS disk space may slow, as more users routinely move files directly to their local hard disk. Also, use of system printers will be more heavily oriented to specialized services, such as color printing, and high speed printing of large reports and document production. User can easily point light printing from system services to their desktop or local LAN printers via Windows or Macintosh print services. They will rarely choose to use remote lpr printing for such jobs as mail printing.

The result will be a suite of TCP/IP network productivity tools available to the University of New Mexico community that supports future growth and flexibility.

* *

ENDNOTES

1. CIRT abbreviates Computer and Information Resources and Technology, the University of New Mexico computing center that combines academic and administrative computing and user consulting services.

2. CIRT expects to begin offering PPP dial-up service as of Fall 1995, which is indicative of rapidly growing pressure to extend the range of IP networking. The suite of desktop TCP/IP tools under discussion herein will become widely available at the same time.

3. I am giving little attention to the Macintosh suite of tools in this paper because the vast majority of our user workstations are Windows PC's. The Macintosh suite is on a slightly slower development track. Please contact me for fuller information on this topic.

4. An interesting alternative that may now be available for academic institutions is the CREN/BitNet TCP/IP suite that is focused for PPP dial-up and promises to be supported with local dial-up access nationwide. CIRT may explore this as an offering that could be made to UNM alumni.

5. WinQVT/Net is a product of QPC Software. E-mail contact: robin@qpc.com. WinQVT/Net's current release (ver. 3.98.9) offers a mini-suite, comprised of POP mail, command line FTP, a newsreader and lpr spooler along with the VT emulator. These are less attractive than the products we have chosen. WinQVT/Net rel. 4.0, due in August 1995, will separate these components.

6. Windows LPR Spooler is a product of Thomas Heil. E-mail contact: th.heil@kfa-juelich.de

7. PC-Pine and Unix Pine are products of the University of Washington. FTP site: ftp.cac.washington.edu
Newsgroup: comp.mail.pine

8.Z-Mail is a product of the Z-Code Division of NCD. E-mail contact: katie@z-code.com

9. Simeon is a product of ESYS Corporation. Email contact: martyt@edm.isac.ca

10. Packages currently using InstallShield include Novell's WordPerfect and Perfect Office Suite 3.0 and IBM's OS/2 Warp BonusPak. Stirling has modified their license, usually limited to one license per commercially released product, to allow for building setup packages for multiple products released within our university setting. There must be one license owned per developer/programmer.

11. Formerly a packet driver, our underlayer is now Novell's ODI underlayer with a packet driver interface (ODIPKT v.3.0) and the WINPKT shim installed.

12. Keyview is a product of KeyWord. (Interestingly, Keyword was acquired the very week I approached them and is now a division of FTP Software.) E-mail contact: demslie@keyword.com

13. Outside In (for Windows and Macintosh) is a product of Systems Compatibility. It was also acquired during our evaluation period, a sign of the strategic importance such technology is assigned.

14. It should be noted that a Mac version of Keyview is in development.

15. WinZip is a product of Nico Mak Computing. E-mail contact: 70056.241@compuserve.com or support@winzip.com

The University of New Mexico

What's included in Mirada disks, pt. 1

- Trumpet Winsock, ver 2.1f (Windows Sockets TCP/IP stack and PPP dialer)
- WinQVT/Net, ver. 3.98.13 (Telnet VT terminal emulator)
- QWS3270, ver. 3.2e (Telnet 3270 terminal emulator)
- WS_FTP, ver 95.08.26 (FTP client)
- Free Agent, ver 0.99 (Usenet newsreader)

The University of New Mexico

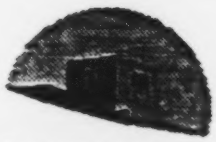
What's included in Mirada disks, pt. 2

- PC-Pine/Winsock, ver. 3.91 (electronic mail)
- Outside In /for Windows, ver. 2.1j (Win/DOS & Mac file viewing & printing utility)
- WinZip, ver. 6.0 (compressed file viewer & compression/decompression utility)

The University of New Mexico

What's included in Mirada's FTP site

- Netscape Navigator, ver. 1.22 (WWW browser, configured for UNM installation)
- additional, optional file viewers for use with Mirada components like Netscape and PC-Pine
- additional, optional Mirada clients for services such as gopher, Midas and CSO
- updates, fixes and additional documentation



The University of New Mexico

How Mirada is licensed

IMPORTANT NOTICE

The Mirada software suite is for the use of students, faculty and staff of the University of New Mexico. It may be used on campus or home PCs that are running Windows and connecting to UNM network services.

You must purchase this software to install it on your PC. You may not install it on multiple PCs, except in the case of UNM departments which have purchased multiple licenses. You may not re-distribute this software to others.

If you (or your UNM department) have not paid for this software, you have an illegal copy.

If you are not affiliated with UNM, you may not use this software.

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Mirada requirements, pt. 1 - PC

- CPU: 386 or above
- RAM: 6MB (8+ MB recommended)
- Hard Disk: 15 megabytes of free hard disk space.
- Operating system: MS- DOS 5.0, Windows 3.1 or Windows for Workgroups 3.11.
- Video: VGA, SVGA (800x600) or better recommended.
- Mouse or other pointing device

Mirada requirements, pt. 2 - connection

- Direct network connection: Active connection via supported network card (3COM or SMC) and software.
  OR
- PPP network connection. Modem, minimum speed 9,600 baud, 14,4 kbps or better recommended connected to a telephone line of reasonably good (audible) quality.

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Mirada Help

- consult the online help for each product in the suite
- locally written "readme" files discussing issues we have identified are provided with MIRADA.
- Usenet News: subscribe to the newsgroup unm.mirada
- CIRT's pages WWW, URL: http://www.unm.edu/cirt.html
- CIRT Help Desk, 277-4848, Monday-Friday, 8am-5pm

The University of New Mexico

Mirada Self-Help

- post a suggested change, proposed documentation or a question for response to the Usenet newsgroup unm.mirada
- contact the CIRT Help Desk and ask to speak to the Mirada contact.

The University of New Mexico
COMPUTER AND INFORMATION RESOURCES AND TECHNOLOGY
(CIRT)

MIRADA

for Windows 3.1 & Windows for Workgroups 3.11

IMPORTANT NOTICE

The **Mirada** software suite is for the use of students, faculty and staff of the University of New Mexico. It may be used on campus or home personal computers that are running Windows and connecting to UNM network services.

You must purchase this software to install it on your PC. You may not install it on multiple PCs, except in UNM departments which have purchased multiple licenses. You may not re-distribute this software to anyone else. When you leave UNM, you may no longer use it.

If you (or your UNM department) have not paid for this software, you have an illegal copy.

If you are not affiliated with UNM, you may not use this software.

Mirada* will allow you to connect to UNM's campus network services and the Internet. This software is pre-configured to work with either a direct network connection or a PPP (modem) connection. If your PC does not meet the minimum requirements, contact the CIRT Help Desk, 277-4848, to discuss your options.

WHAT'S INCLUDED:

On the **Mirada** disks:

- Trumpet Winsock, ver 2.1f (Windows Sockets TCP/IP stack and PPP dialer)
- WinQVT/Net, ver. 3.98.13 (Telnet VT terminal emulator)
- QWS3270, ver. 3.2e (Telnet 3270 terminal emulator)
- WS_FTP, ver 95.08.26 (FTP client)
- Free Agent, ver 0.99 (Usenet newsreader)
- PC-Pine/Winsock, ver. 3.91 (electronic mail)
- Windows LPR Spooler, ver. 4.0c (printing to CIRT system printers from Windows applications)
- Outside In /for Windows, ver. 2.1j (Win/DOS & Mac file viewing & printing utility)
- WinZip, ver. 6.0 (compressed file viewer & compression/decompression utility)

At the ftp site (UNM_dist.unm.edu, an ftp site only UNM-affiliated folk can reach; get there using WS_FTP):

- Netscape Navigator, ver. 1.22 (WWW browser, configured for UNM installation);
- additional, optional file viewers for use with **Mirada** components like Netscape and PC-Pine;
- additional, optional **Mirada** clients for services such as Gopher, Midas and CSO; and
- updates, fixes and additional documentation, including both electronic copies of manuals for parts of the suite and locally produced documentation.

SYSTEM REQUIREMENTS:

CPU: 386 or above (486 or above recommended)
RAM: 6MB (8+ MB recommended)
Hard Disk: 15 megabytes of free hard disk space
Operating system: MS- DOS 5.0, Windows 3.1 or Windows for Workgroups 3.11
Video: VGA, SVGA (800x600) or better recommended
Mouse or other pointing device
Direct network connection: Active connection via supported network card (3COM or SMC) and software
OR PPP network connection. Modem, minimum speed 9600 baud, 14.4 kbps or better recommended connected to a telephone line of reasonably good (audible) quality

PRE-PLANNING: Before you run this software you will need to:

1. Backup your critical software and data files.

2.a. with a direct network connection: Be sure you have an active network connection by using Telnet to log in to a CIRT Unix machine. (If you do not have an active connection, call the CIRT Help Desk, Monday-Friday, 8am-5pm for assistance.)

OR

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*Mirada is a Spanish word meaning a look or a view.

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2.b. with a PPP connection: Be sure you have a modem that can successfully dial and connect to one of CIRT's normal (ASCII) dialup lines, 277-9990 through 277-9994.

INSTALLING MIRADA:

Part A (the disk set): From Windows Program Manager (not the MS-DOS prompt):

1. click on File
2. click on Run...
3. enter a:setup or b:setup depending upon where the diskette is.
   (for PPP modem connection, enter a:setup ppp or b:setup ppp)

After the install is completed, close Windows. Reboot your PC – preferably by turning it off and back on.

Part B (Netscape Navigator & other items on the ftp site, UNM_dist.unm.edu): From Windows Program Manager:

1. in the Mirada program group, double-click on . When WS_FTP, opens for the first time, it will point to the Mirada distribution site. Using your mouse or the tab key, move the cursor to the box titled User ID;type your CIRT Unix login-id. Click on the Save button to store this information.
2. click the OK button to connect to the Mirada site. When the password box appears on your screen, type your CIRT Unix password and click OK. After a moment, you are connected. The left half of the FTP window displays information frm your PC, a directory list in the upper box and a file list in the lower box. The right half displays directories and files for the remote computer to which you are connected.
3. retrieve Netscape Navigator for Windows: Double click on the subdirectory named PC in the upper right hand box. A new list of files will appear in the lower right box. Note the subdirectory listed on your PC, which should be C:\TEMP. If not, click on ChgDir, type C:\TEMP in the pop-up box and click OK. Double click on n16e122.exe to transfer Netscape Navigator to your PC. Click on Exit to close your connection and quit FTP.
4. open an MS-DOS session on your PC. At the prompt type CD \TEMP [Enter].
5. Type n16e122 [Enter] at the DOS prompt to uncompress Netscape. Type exit [Enter] to close your MS-DOS session.
6. From Windows Program Manager, click on File
7. click on Run...
8. click on Browse... , select C:\TEMP. Select setup.exe and click OK. Click OK again in the Run box to start the Netscape installation. Follow the directions on your screen.

IF PROBLEMS OCCUR/GETTING HELP: If you have problems while installing or using the Mirada software suite through Windows, you can check several sources of information for help, information and updates:

- the online help for each product in the suite
- locally written "readme" files, discussing issues we have identified, are provided with Mirada
- Usenet News: subscribe (use the Free Agent newsreader) to the newsgroup unm.mirada
- CIRT's pages on the UNM WWW site (URL: http://www.unm.edu/)
- CIRT Help Desk, 277-4848, Monday-Friday, 8am-5pm

ALSO, we need your help: Producing and supporting a suite of network applications is a complex task that is not finished when the first release becomes available. If you have suggestions for improvements or additional features which should be documented, you can help by:

- posting a suggested change, proposed documentation or a question for response to the Usenet newsgroup unm.mirada
- contacting the CIRT Help Desk and asking to speak to the MIRADA contact.

MIRADA

FOR WINDOWS 3.1 & WINDOWS FOR WORKGROUPS 3.11

Mirada is an integrated collection of Internet tools that will simplify and streamline the use of network services, including electronic mail and transferring files between desktop machines and shared systems. Following is a brief description of the programs that comprise **Mirada** and their capabilities.

AUTO-INSTALLATION: **Mirada** has been set up to install automatically on your Windows PC, similarly to other Windows software. Read the installation instruction sheet for details. If you have Windows 95, there is partial support. Contact the CIRT Help Desk, 277-4848, for details or check for CIRT's Windows 95 and **Mirada** Web pages (the CIRT Help Desk's Web URL is http://www.unm.edu/~hdesk).

TCP/IP STACK & PPP DIALER: Trumpet Winsock provides a TCP/IP stack that supports both a direct network connection and a PPP (modem) connection.

ELECTRONIC MAIL: PC-Pine/Winsock offers an interface very similar to PINE on UNIX. On your own desktop, this program allows you to attach and read files that are stored on your hard disk and diskettes into mail messages without having to first upload the files to a shared system. Desktop mail can easily save incoming messages or attachments to your local hard disk, and it offers more choices for editors. You may use any Windows text editor or word processor as a mail editor. Mail attachments can be viewed with the integrated viewer (see Viewer, below).

FTP: WS-FTP connects to any FTP site on the Internet with a menu-based interface similar to Windows File Manager. WS-FTP allows files to be transferred between FTP sites and your desktop computer without first transferring files to your UNIX account. It also permits text information such as indexes, readme files, etc. to be viewed before downloading large files and it greatly simplifies navigating through an FTP site. FTP sites helpful to the UNM community are already loaded. There are pointers to the **Mirada** site for extensions and upgrades (including Netscape) and valuable technical support sites, such as the WordPerfect and Microsoft sites.

FILE COMPRESSION: WinZip can compress and decompress all common UNIX and PC compressed file types. A built-in viewer allows you to examine text files within compressed files before you decompress them. A connection to Quick Views Plus (see Viewer, below) allows viewing nearly any other compressed file. Connections to popular anti-virus software, including F-PROT (CIRT's supported virus checker), allow checking for viruses before decompressing software.

TERMINAL EMULATION: WinQVT/Net, a Vtxxx terminal emulator for connecting to UNIX and VMS systems, permits key-mapping customization and use of local Windows features, such as cut and paste abilities across platforms (from a shared system to your desktop, for example). QWS3270 is a TN3270 terminal emulator for connecting to IBM mainframe environments (such as UNMMVS and UNMVMA).

NEWS READER: Free Agent is a Usenet News reader which opens three windows (group list, thread and article list, and article viewer) simultaneously. It has point and click functions and the ability to decompress uuencoded files and invoke an associated program for viewing files.

LPR SPOOLER: Windows LPR spooler allows printing files directly from a Windows application to a CIRT system printer on the network, such as CIRT's Xerox 4700II Color Document printer or high speed PostScript

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printer. Remember there are fees for color printing!

VIEWER: Quick Views Plus (formerly Outside In) handles both Mac and PC file types and a wide variety of file types within word processing, spreadsheet, graphics and database software. Files can be viewed and printed from the desktop even if you don't own the application which created the document. Windows cut and paste works, allowing movement of data to your own documents.

WEB BROWSER: Netscape Navigator, preconfigured for UNM's WWW site and to use the Quick Views Plus viewers, is waiting for you on the **Mirada** FTP site, ready to install.

AND MORE: Keep checking the **Mirada** FTP site for product updates, bug fixes, extensions to the suite, added documentation, product upgrades and announcement of **Mirada** for Windows 95 and Macintosh.

A PRETTY GOOD PAPER ABOUT PRETTY GOOD PRIVACY

by: Roy McCollum, MIS at NMSVH

With today's growth in the use of electronic information systems for E-mail, data development and research, the relatively easy access to such resources by all, protecting your data and correspondence has become a great concern. Every time you use E-mail, you're giving system administrators, postmasters, and many others the opportunity to read your data. What is needed is a secure method that lets you keep private your mail, your manuscripts and your data. Pretty Good Privacy (PGP), an encryption program developed by Phil Zimmermann may be just the software tool you need.

In this presentation I would like to demonstrate the strengths of PGP for E-mail purposes in its simple form. This presentation will not encompass all the possibilities that this software can or might possibly do. I will also discuss where and how one can obtain the current versions of the public domain PGP.

With PGP, you can encrypt messages that can be read only by a person using a special decryption key. This keeps your private communication with others secure and accessible.

Throughout history keeping information private for whatever reason has had many methods and encryption was difficult. Many times you were required to give the same secret code (key) to each person communicated with. However, any individual that held the knowledge of the encryption code (key) could decrypt and read communication whether or not they were the intended recipients, not a very secure system. Probably one of the most famous encryption methods, in recent history, is the Enigma system developed by the Nazis during WWII.

With PGP, no one can decrypt your file except the person you present it to, provided you encrypted your file with that person's public key. PGP uses a two-key method of encryption: a private key that only you have and a public key that you freely give to others.

On the surface, this system doesn't sound very secure or manageable. Why freely give out a key to all who might present you with encrypted information? However, with PGP, a person uses your public key to send you encrypted information. With PGP's method only your private key can decrypt this information, and as you might imagine, you never give your private key to anyone. With PGP's two-key encryption system, your information is secure.

At this point we have a general concept of how PGP might work for us. During this presentation we will explore how PGP can secure your file. But first let's look at how the PGP software is installed. The programs that make up PGP are available for several computer operating systems such as DOS/Windows, Macintosh, UNIX, OS/2, VAX and VMS. In this presentation, I'll discuss the DOS installation procedures since many people have access to this particular operating system, keeping in mind that it is similar to the UNIX installation procedures. Depending on your operating system, you may have to compile the source code that is made available by Phil Zimmermann.

Before you can install PGP on your system, you'll need to make sure you have a copy of the program. The current version is PGP 2.6.2. It generally comes

in the ZIP compressed-format, so you will need to have a copy of PKUNZIP (ver.2.04g) on your computer in order to decompress PGP into its various files.

We will create the following directory on our local or home directory:

drive:\pgp262

For convenience sake we will locate the file PGP262.ZIP in the \pgp262 directory and use the PKUNZIP program to decompress the file with the following command line:

pkunzip pgp262.zip (Assuming PKUNZIP is found in the PATH variable.)

PGP262.ZIP is a double-nested zip file. After performing the above command you will see the following file list:

PGP262.ZIP (Original file.)
PGP262I.ASC (Signature file.)
SETUP.DOC (Current setup documentation.)
PGP262I.ZIP (Programs, license, documentation.)

It is best to read the SETUP.DOC file for any current information concerning the changes to this installation process.

Now we will decompress the programs, license and documentation files and use the -d switch with PKUNZIP. This will create the proper subdirectory for the documentation files. If it is not used, the documentation will be dropped into the current directory.

pkunzip -d pgp262i.zip (Assuming PKUNZIP is found in the PATH variable.)

After successfully decompressing the compressed files, your directory list should look similar to the following illustration:

Note: The files size, date and times are omitted for commenting.

Directory of C:\PGP262
Volume in drive C is MS-DOS_6
Volume Serial Number is 1EF1-4B29

.	**<DIR>**		**(Current directory)**
..	**<DIR>**		**(Parent directory)**
CONFIG	**TXT**		**(The PGP configuration file)**
DOC		**<DIR>**	**(Directory holding documentation)**
ES	**HLP**		**(Spanish help file)**
FR	**HLP**		**(French help file)**
KEYS		**ASC**	**(Public keys of PGP developers)**
LANGUAGE	**TXT**		**(Selected prompt lines by selected language)**
MITLICEN	**TXT**		**(License Agreement from MIT)**

PGP		**EXE**	**(The Pretty Good Privacy program)**
PGP		**HLP**	**(PGP help file data)**
PGP262	**ZIP**	**(Nested**	**Compressed files hold all files)**
PGP262I	**ASC**		**(Confirmation signature file)**
PGP262I	**ZIP**		**(Compressed file hold files without**
asterisk)			
README	**DOC**		**(Current information about the**
enclosed files)			
RSALICEN	**TXT**		**(RSA license agreement)**
SETUP	**DOC**		**(Information on the setup of PGP)**

[other directory information]

The \PGP262\DOC directory will or should include text-file manuals with information on PGP. You can refer to these text files if you want to learn more about PGP or you might pick up Simson Garfinkel's book titled, PGP, published by O'Reilly & Associates. Simson's book will give you a bit of the history in Phil Zimmerman's development of PGP and some depth in the components used in the PGP programs.

Having now made the PGP program files available for our use we must modify some of our DOS environment settings. This is generally done with a simple ASCII text editor like DOS's EDIT or Window's Notepad. The DOS file that we will alter is AUTOEXEC.BAT. This file is found in the root directory (i.e. C:\>). (Using word processors such as WordPerfect or Microsoft Word and saving the modified file in their default format will cause errors from within the AUTOEXEC.BAT file.)

Whenever you start to modify boot-process files, it is always wise to make a copy of the original file. In our case we will copy the AUTOEXEC.BAT file to AUTOEXEC.ORG. That way, if something goes wrong, we can restore the original AUTOEXEC.BAT with its commands. When making a backup, use the following command:

copy c:\autoexec.bat c:*.org

There are a couple of global-environment variables that need to be defined and an addition to the PATH environment variable. If you have a well-written AUTOEXEC.BAT file, you should find these variables defined near the top of the file.

At this point we will open our text editor and load AUTOEXEC.BAT. First we will append the PGP262 directory context to the PATH statement. The following should be somewhat representative of a modified PATH statement's text:

path=c:\;c:\dos;c:\windows;c:\pgp262

Next we will add two environment variables at some location within the AUTOEXEC.BAT file. Generally you should find all your global-environment variables located in one area of the file. The first one that we will add is the

PGPATH variable. This DOS global-variable is used by PGP to locate its support files and should be defined to point to PGP's context. Its syntax should be on a line by itself and entered as follows:

set pgpath=c:\pgp262

Finally, we will set the time-zone variable to represent the local time-zone in which the program will be used or that should be reflected by PGP. Enter the following syntax:

set tz=xxxnxxx

Replace xxxnxxx with text that reflects your desired time zone (e.g., EST5EDT for Eastern, CST6CDT for Central, MST7MDT for Mountain and PST8PDT for Pacific.) Our syntax should look like the following and also be on a line by itself: SET TZ=MST7MDT. And if you're anything like me you will have to do this twice because you incorrectly typed one of the commands thus causing a syntax error when I reboot the computing machine to activate the changes in the AUTOEXEC.BAT file.

Having now successfully booted our computer, we need to create the private and public keys. Let me say that again: Before encryption of a file can take place with PGP, you must make a private key and a public key. The private key is for you only and should never be given to the public in any way, shape or form.

To begin the generation of our private key in this presentation we need to change to our PGP directory and at the DOS prompt enter: PGP -kg. You will see the screen output and program prompt as shown below:

C:\PGP262> pgp -kg
Pretty Good Privacy<tm> 2.6.2 - Public-key encryption for the masses.
1990-1994 Philip Zimmermann, Phil's Pretty Good Software. 11 Oct 94
Uses the RSAREF<tm> Toolkit, which is copyright RSA Data Security, Inc.
Distributed by the Massachusetts Institute of Technology.
Export of this software may be restricted by the U.S. government.
Current time: 1995/10/28 12:35 GMT
Pick your RSA key size:
1) 512 bits - Low commercial grade, fast but less secure
2) 768 bits - High commercial grade, medium speed, good security
3) 1024 bits - "Military" grade, slow, highest security
Choose 1, 2, or 3, or enter desired number of bits:_

PGP is now prompting for a key size and the greater the key size, the more secure PGP's encryption will be. By using the military-grade key size, we will have the best encryption and still have optimum speed on today's average microcomputer. Upon entering 3 at the prompt, PGP will then prompt us for our user ID. PGP recommends that you use your name followed by your E-mail address, such as:

H.G. Wells <HG_Wells@novels.com>

PGP then requires a pass phrase. This phrase is used to unlock the private key, which enables us to decrypt messages. Use a phrase that's easy to remember and type, don't use anything short and simple, such as your significant other's name, your pet Fluffy's name, or your Social-Security (not so secure) number. In our presentation we will use the pass phrase of:

THE UNDYING FIRE AND PHILOSOPHICAL AND THEOLOGICAL SPECULATIONS.

It's important to remember your pass phrase because you'll need to enter the exact phrase each time you want to unlock your private key. PGP is case, space and punctuation sensitive so pay attention to what and how you type your pass phrase. To PGP, "PHILOSOPHICAL" is not the same as "Philosophical". And remember, NEVER write down your pass phrase. Most security violations occur when someone finds your pass phrase written down.

Upon entering our pass phrase at the prompt and pressing the Enter key, PGP will ask us to enter our pass phrase a second time and check for a confirmed match. PGP will then prompt us to enter a number of random keys. PGP will be using the time between keys pressed for random numbers, so don't hit the same key over and over at the same rhythm. Type in phrases from your childhood (no the clean ones), your favorite hangout's menu or you might type the "99 Bottles of Beer on the Wall" song (you know the one you were trying to sing in the bar last night.) Type until PGP beeps and at this point PGP will display a wait message as it generates the keys.

When the program completes the key generation we will be beeped again and we will notice two new files in the PGP directory: PUBRING.PGP and SECRING.PGP. The file PUBRING.PGP is our public key-ring and it contains our public key and will hold the public keys of other people to whom you'll encrypt information files. The private key that we use to decrypt files with is in the SECRING.PGP file (one thing about PGP's key rings - they will not wear a hole in your pocket.)

Now, at this point we would want to copy both of the ring files to a blank floppy disk and keep it in a safe place. What is a safe place? NOT next to the computer where someone could find the disk and open the files. Remember, they are useless without your pass phrase, so don't write down your pass phrase and place it with the disks. Also keep in mind that diskettes are subject to magnetic fields and will not last forever.

Next, we need to create a text file that will contain our public key. Persons wanting to send you encrypted files will use this public key. At the DOS prompt, in our case, enter:

pgp -kxa H.G. Wells

The PGP directory will now include a file called WELLS.ASC and the text in this file is YOUR public key. Your public key information will look something like this:

--BEGIN PGP PUBLIC KEY BLOCK--
Version: 2.6.2

Adsfasdfl-9904r, czo9809qerokueru]wet] m]oet01b]5\- 2]-]4][obv\\[5yeiy \rt\uyen oyuoe5o5o[u9]5-0ty8i09eruvqtvubqwkfbasraebPaoirt9vbuqerito pvwerutvur9tuvwetivtasfasdfjkuiop=]4368741dffafasdfasdfasdfdghjfgjh vbcubb68ol8yoluybtr4f29g8ynjogrcfXFTEET8HJRSSERTWQETGYDFGD =DRdt
--END PGP PUBLIC KEY BLOCK--

Now we have our public key to give to our associates. Your friends will be able to send encrypted files to you and, since they also have PGP, you can send encrypted files in return. Here in our presentation, we will send a file to our friend AnnVeronica@prison.gov.

But first, we'll need Ann's public key. She has sent her public key to us in an E-mail message that she saved in a cake, I mean file named VERONICA.ASC. At this point we can add Ann's public key from this file to our public key ring by using the following command:

pgp -ka VERONICA.ASC

Whenever we add a new key to our public-keyring file, PGP will ask if you can certify that the key is genuine (truly the one created by the recipient.) Certification is a subject we will not go into detail with at this time, so we will answer No to PGP's prompt. Certification is a method in which you can attest to the validity of a public key's owner.

Next, we are going to write a letter to Ann and in this message we will include our public key so that she will be able to send us encrypted mail later. We save our letter to a file called ANNLTR. Now, using PGP, we will encrypt this file by using the command:

pgp -seat ANNLTR Ann -u H.G.

OK, let us take a closer at this command, it's switches and parameters. The format of the encrypt command is:

pgp -seat filename recipient's_userid -u my_userid

In our example encrypt command, -seat and -u are PGP commands, as defined:

s Sign the file.
e Encrypt the file.
a Use ASCII characters only.
t Keep line feeds with returns.
u User's secret key used to create a signature.

These commands instruct PGP to encrypt our message file using only ASCII characters and to use our computer's linefeed options. Using the a command is important since some Internet E-mail systems will accept only plain ASCII text characters in a message. PGP then signs the letter with the name of the sender and prompts us for our pass phrase.

At this point, PGP encrypts the file and names it ANNLTR.ASC. Now we can use our E-mail to send Ann a short message in which we will either enclose the ANNLTR.ASC file's text or attach the ANNLTR.ASC file as an enclosure to the message, depending on the desire of the sender or the strength of the E-mail program. If placing the encrypted text of the ANNLTR.ASC file in the body of the message, it might look as follows:

From: HG_Wells@novels.com
To: AnnVeronica@prison.gov

This is a recipe for a file, I mean cake, hope you're doing fine.

--BEGIN PGP MESSAGE--
Version: 2.6.2

Asdfasdfsghy tnymim,ftnyunmom nfy83w7 nruy9m e6bn890,e6bont7iym9, 8mytr5654nfghkop-8]./],[mtnd5qa2wezfvgyn8y9,o uicn80ui ,.--9]i,jhugiue4 e56tw6ni870,.pw4be67u9iuohy8u8uedr89yu0omn87ygwervybjun89586q233 2w8=;\],.;ymytyr21qWA3WE45VKI'./\=]DSWEDNY8IM9U07TR5N76TB WBMKOL,HGCFYTHNUINSEDRFSRFBYUJNFGUIM,IOP;MHUYNU9 REE45RWBYNM,LOPM;UIHJBUMUO,UYTGBFTNGUIM,KIP;.[]'N JNBHBGRT7H8UAbnygmhik
jnimgghjhbseDBFTYnYguNRUFGUNRTYGYJIMTrtbyntjENDRcftyHUt UYhUtyIUmfTyurFuhUFhIbYdnRYNYFybtuNo<pl">? DrdF5E%NUL UhbHuN6mL
Frtnyuyk< tfYhNM:.CvbnKMLnbbNImLGY*)Ui(FTyGJY&Y#Q$ ER mt<P{>; =$ITY
--END PGP MESSAGE--

When Ann opens her mail and reads this message, she would then use PGP to decrypt it. First, she will have to save the enclosed file or the message as HGWLTR.ASC, and then, to decrypt the file, she'll use the PGP command;

pgp HGWLTR.ASC

The PGP program will then prompt Ann to enter her pass phrase. After correctly entering her pass phrase, PGP will let her know that we (H.G.) signed the file and will then produce a text copy of the original unencrypted ANNLTR file. She can use any text editor or word processor to read it.

If Ann has not lost her computer and network rights from the message, she can write her reply, whereupon she will use our public key to encrypt it. With PGP, we don't have to worry about anyone reading our private messages.

At this point I hope you have learned some of the basic features of PGP. I recommend that you take some time to read the documents that come with the program or one of the many books now published on the software product. They include the many commands and methods of use and can only add to the power of Phil's software. (Note: I understand version 3 will be available sometime in the near future.) With this presentation you should be able to begin sending and receiving encrypted mail or protecting that confidential data or that prize-winning manuscript.

Now for the rough part. Where can I get PGP? You can find PGP on shareware disks, bulletin board systems, and Internet sites, but the most secure and controlled place to procure PGP is from the Massachusetts Institute of Technology (MIT), the official PGP distributor for noncommercial use of the software. For commercial use of the product get in touch with ViaCrypt, they are the licensed reseller of PGP.

You can get the PGP program by way of a Web browser, FTP, or several online services. If you have full World-Wide Web access with software such as Lynx, Mosaic or Netscape, you can find PGP at MIT using the following context:

http://web.mit.edu.network/pgp-form.html

But before you can download PGP, you must read two licensing agreements online and answer the questions in an electronic form similar to the one shown below:

Are you a citizen or national of the United States or a person who has been lawfully admitted for permanent residence in the United States under the Immigration and Naturalization Act?
Yes or No

Do you agree not to export PGP 2.6.2 or RSAREF to the extent incorporated therein, in violation of the export control laws of the United States of America as implemented by the United States Department of State office of Defense Trade Controls?
Yes or No

Do you agree to the terms and conditions of the RSAREF license (in /pub/PGP/rsalicen.txt)?
Yes or No

Will you use PGP 2.6.2 solely for non-commercial purposes?
Yes or No

Submit

You also must agree not to export PGP to anyone outside the US. None of this information identifies you, I am told. MIT merely asks these questions to adhere to US laws concerning encryption technology, I am told. After you answer the questions, click the Submit button.

You will then be able to download the PGP file to your system (maybe!). Can't download PGP right away? Could be that the MIT server is busy as it allows only about 20 downloads at any one time, I am told. So simply return to the previous MIT page and submit your information again. If the server is still busy, you might want to try again after regular business hours (beats me what they are.) There are a couple of other reasons the server at MIT might not let you download PGP.

Number One: The hidden directory that holds the PGP software has changed since you started the process. The name of the directory that holds the software changes every 30 minutes (on the hour and the half hour.) Because of this, you must get the PGP files in the same half-hour period that you answer the questions. So check your time and hope that network traffic is not high. The directory context that holds the software looks something like the following:

/pub/PGP/dist/U.S.-only-xxxx (where xxxx is a randomly generated set of digits and/or letters)

Note: the UNIX , VAX and a few other versions are also located here.

Number Two: The MIT server will prevent you from downloading PGP if it thinks your host or network or Internet service provider is outside the United States. If you get a message saying that you're outside the US and you aren't, send E-mail to postmaster@net-dist.mit.edu and include the domain name of your Internet connection, such as amazon.com and try to convince them that you re not located along the river somewhere. Those of you who use a university's domain name will probably not have this problem. Those who use technet.nm.org, should not have a problem because I've already convinced them that we are not located in Mexico. And they have added it to the OK list at MIT.

Once you pass MIT's security (?) check, you ll get a list of PGP files to choose from. MS-DOS users should select PGP262.ZIP. Macintosh users will need MacPGP2.6.2sea.hqx. Also remember to get a copy of PKUNZIP to unzip the files in PGP262.ZIP if you don't have it. You can find the latest version in a file called pkzip24g.exe on most anonymous FTP servers.

For those of you that use FTP to acquire things get the following file:

ftp://net-dist.mit.edu/pub/PGP/README

As with the Web, the FTP location of PGP changes also, this is to ensure that you read the licensing and non-export agreement before you obtain PGP from MIT.

I have read that if you're using the Internet through America Online (AOL), you can get PGP by going to the AOL software library (KEYWORD: Software) and performing a search for PGP. On CompuServe, you type GO NCSAFORUM, follow the instructions to gain access to Library 12 (it is export controlled) and then look for the file PGP262.ZIP. I have yet to receive permission.

I have also read articles that state that you can get PGP via your E-mail. If you do not have access to FTP, send a message that says "help" to: ftp-request@netcom.com or mailserv@nic.funet.fi. I assume you will receive instructions on how to get PGP in uuencoded form and you will then need a uudecoding program such as WinCode or Uundo to prepare PGP for use.

For Windows users there are some public-domain and shareware programs that will interface with Pretty Good Privacy so that you will not have to launch a DOS window. One of these programs is WinPGP, an easy-to-use Windows-based PGP shell. WinPGP costs $29.00 to register and upgrades are free. To find a copy of WinPGP on the World-Wide Web or through FTP, go to either of these Internet sites.

http://www.firstnet.net/pub/windows/winpgp/pgpw31.zip
ftp://ftp.firstnet.net/pub/windows/winpgp/pgpwin31.zip

There is a version of PGP for OS/2 and it is located at:

http://www.gibbon.com/getpgp.html
ftp://ftp.gibbon.com

In closing this presentation I would like to mention the UseNet News group for PGP alt.security.pgp. It has the typical, many and varied persons of such a group but is also one of the best sources of information relative to PGP.

I would also remind system supervisors and administrators - be aware of your system's data. In addition to pretty good privacy, PGP also provides an excellent tool for users to ransom you data files. So keep your backup files current - I'm quite sure that NSA will NOT allow you to use their resources to decrypt your data.

References

Pretty Good Privacy <tm>
Documentation Files

PGP
Simson Garfinkel
O'Reilly and Associates

THREE C's AT UNM: COMMUNICATION, COLLABORATION & COOPERATION

by: Bill Adkins
and Linda Miller,
Computer & Information Resources & Technology
University of New Mexico

Paper not submitted for publication

DOES COPYRIGHT INFRINGE ON FREEDOM TO EXCHANGE IDEAS?

by: Barbara Delzell,
Engineering Library
New Mexico State
University

"Nothing is so firmly believed as what we least know."
--Montaigne

Before a response to this question can be addressed, both freedom to exchange ideas as well as copyright need to be examined separately. Freedom to exchange ideas will be viewed by way of very brief philosophical consideration of concepts which it encompasses, freedom of thought and freedom of speech. Copyright will be viewed in more detail from a historical perspective. An outline of concepts, some milestone events, and their relationship to intellectual freedom will be discussed.

Intellectual freedom

"Give me the liberty to know, to utter, and to argue freely according to conscience, above all liberties." --John Milton

First, to say it's generally accepted that humans should be free to exchange ideas is probably not an exaggeration. The act of exchanging ideas contains within it two foundational abilities, the ability to think and the ability to express that thinking. From birth to death, we are literally free to think whatever thoughts we wish, without external hindrance. The working of a person's mind is generally held to be a private and personal matter, as long as it remains concealed. This seemingly inborn liberty, however, is not satisfied with concealment. Humans are compelled by another seemingly inborn trait, to share - reveal - communicate - the product of their thinking. Socrates represents the extreme of this compulsion when he stated he would prefer to die than to refrain from expressing his thoughts. Socrates' position might not be the generally accepted one. It's probably safe to say, however, that for most humans, the ability to think freely has little value without being accompanied by the freedom to express the product of those thoughts.

The form of this expression is given life in both spoken and written word, art, music, dance, regardless of medium, and includes freedom to speak and write, freedom to hear and read. The idea of such freedom seems very simple, but in fact has a long, bloody history. Centuries of struggle precede the relatively calm environment in which we today routinely practice those freedoms, relatively unhindered. Perhaps it's because there is so little obvious hinderance that most of us take these freedoms as a matter of course, and for granted.

Copyright

"Next to the originator of a good sentence is the first quoter of it." Ralph Waldo Emerson

Copyright law can be traced back to sixteenth-century England. There are those who might argue that copyright origin has little relevance to so-called modern times. But even a cursory inspection of its origin and evolution, created by book publishers in England over 450 years ago, reveals extraordinary parallels in the present day. Technology, in the form of printing presses, was the driver for invention of copyright. Today, technology is once again the driver behind a

renewed and concerted effort by copyright owners to establish their territory. The English originators intended to establish a sanctioned monopoly; current trends indicate the same direction and intention. Means of transmission is irrelevant, whether printing press, or the internet. The real and very critical issue is the nature of copyright and its relationship to civilization as we know it. The primary purpose of copyright, as stated in the Constitution of the United States, is to promote the public welfare by the advancement of knowledge. The general impression of the American public seems to be that this is where and how copyright began, from within our Constitution, based on public interest. That is far from the truth. Public interest was not the primary concern or even part of concern in the origination of copyright, as is shown below.

In a global sense, copyright law is the law governing access to the material of learning in whatever form, through any given medium. Simple logic is sufficient to show the outcome of such governance if rights are granted only to creators and purveyors of this material. A very streamlined timeline follows, showing how the concept of copyright went from a censorship tool, to a promotion-of-learning tool. In addition, a brief table will show the theoretical bases which these polarities reflect. Both the timeline and table are derived from Patterson and Lindberg's '*The Nature of Copyright*'.

Copyright timeline

1557 The Tudors granted a royal charter to the guild of stationers; Stationary Company created; precise time of copyright created by merchants is unknown; sanctioned by government as a way to control the press and thus avoid dissent and unrest among 'the people'. Copyright began by and for the benefit of booksellers/stationers; it was a sanctioned monopoly.

1558 Elizabeth I extends charter.

1566

1586 Star Chamber Decrees

1637 These decrees reflected various forms of censorship. Book sellers/stationers promoted censorship and press control to support and perpetuate a profitable monopoly.

1694 End of legally sanctioned censorship. Booksellers/stationers no longer had public protection of the private copyright. They attempted to reinstate censorship laws but were unsuccessful. A new tactic emerged: they sought protection of authors' rights instead of their own, and were successful, to some extent.

1710 The Statute of Anne
"An act for the encouragement of learning, by vesting the copies of printed books in the authors or purchasers of such copies, during the times therein mentioned." Notable notes: Parliament turned the tables on the monopolists. Key outcomes of the Statute: first, the stationers' copyright, previously used as a device of monopoly and censorship, was

transformed into a trade-regulation concept designed to promote learning. Second, the public domain for literature was created. This was the first instance of public interest being served. The fatal flaw that prevented total success in destroying the booksellers' monopoly was grandfathering of the old stationers' copyrights for 21 years.

1731 Stationers' perpetual copyright expires.
'Battle of the Booksellers' begins, spanning a forty year period of relentless campaigning to perpetuate their monopoly. Ultimately, after failing to get the stationers perpetual copyright reinstated, the tactic turned into obtaining an author's perpetual copyright.

Milestone cases during this period which ultimately impacted US copyright law:

Millar v. Taylor (King's Bench) 1769
Treated copyright as an author's right. Precedent lasted five years. Patterson and Lindberg contend that this case has been misread by American courts and commentators due to incomplete records. More complete records are now available in '*Cobbett's Parliamentary History*' - 1817.

Donaldson v. Beckett (House of Lords) 1774
Patterson and Lindberg contend that this case was where the present day confusion over theoretical duality was born - onetheory that copyright origin occurs at creation (proprietary), the other that origin exists only by statute, (regulatory).

1789 U.S. Constitution empowered Congress to protect literary property and inventions.

1790 Copyright Act of 1790. First U.S. copyright statute, using the Statute of Anne as its model.

1909 Major revision of Act of 1790 - significant change: 'the copyright owner's rights are limited to those specified in the statute.'

1976 Copyright Act of 1976. Major revision and enlarged scope of copyright to include new technology. This statute reflects the underlying premise of distinction between the work and its copyright.

Copyright law is complex. So it's important to simplify by tracing the theoretical issues still under debate in and out of court today, their related origins, and relationship of authors, copyright owners, and users. The crucial importance copyright plays in what amounts to the control of information makes it imperative that interpretations are applied according to intended premises. And all parties involved (essentially everyone), need to have some grasp of the core issues and intended premises in order to monitor, participate, and act responsibly.

Contrary to popular belief, copyright law is not cast in stone. There is an ongoing debate in the judiciary system and among its practitioners. The debate is about whether the nature of copyright is proprietary, or regulatory. A short table follows to help clarify origins and proponents of each theory, and resulting trends.

Theoretical issues still being debated about the nature of copyright.

PROPRIETARY	VS	REGULATORY
Origin occurs at creation.		Origin exists only by statute.
Natural-law property right.		Statutory grant of a limited monopoly.
Origin of booksellers'/stationers monopoly and censorship tool.		
Copyright owners, authors, competitive others with vested interests are primary proponents.		Congress, 'the people', non-users, benefit from this theory.
Court cases raise this most often concept because most of the modern cases brought to court are brought by from publishers.		19th century courts favored this This concept was the basis of law 1790 to 1976.
Contemporary courts favor this concept.		

Both the proprietary and regulatory premises are available for judicial application. The seemingly inconsistent interpretations are a reflection of what Patterson and Lindberg call "jurisprudential flaw of copyright: the failure of the courts to distinguish and to treat as separate entities the original work, the copyright, and a subsequent copy of that work." Another consequence of that same misinterpretation can be seen in the example of the Copyright Clearance Center, which 'licenses' personal use of published works by copying. This amounts to a 'user tax', and is based on the idea that the copyrighted work is the 'property' of the copyright owner.

Discussion

"The law hath not been dead, though it hath slept".
--William Shakespeare

The Constitution empowers Congress to enact copyright statutes. This power is limited to granting copyright to authors only. The law of entrepreneurs' rights derives from authors rights. The law of users' rights is a by-product of the limitations on rights of authors and publishers as copyright owners. The intent, mandated by the Constitution, is that **ideas must be free for all to use. Copyright does not protect ideas, only their expression.** Because the law of users rights is in essence a second order derivative of limitations on creators and distributors, it's not surprising that this segment of copyright is typically left in silence. Certainly those whose interests are best served by monopolistic frameworks aren't going to articulate anything contrary to their interests, even if to do so would rightly serve public interest. Because of the confusion over the nature of copyright, even those who seek to support and enhance learning and the public good may unintentionally fail to see long range consequences of any given choices or decisions.

Two examples follow, to illustrate how current events are reflecting this very serious problem. Fair Use is universally applicable to all copyrighted works without exception: this conclusion is based on the copyright act, and isn't undergoing any controversy. That it should be extended to new technology is intended in the law, and is a logical conclusion. However, the opposite is happening, as illustrated in the first example, a brochure published in 1987 by EDUCOM and ADAPSO excerpted below:

> (1) Unauthorized copying is illegal. Copyright law protects software authors and publishers, just as patent law protects inventors.
> (2) Unauthorized copying of software by individuals can harm the entire community
> (3) Unauthorized copying of software can deprive developers of a fair return for their work, increase prices, reduce the level of future support, and inhibit the development of new software products.

Using the interpretation consistent with the Constitution, the first error is equating copyright law with patent law. Patterson and Lindberg point out that more importantly, nothing is said about fair-use, which does NOT require authorization, and is typical of officious pronouncements, often taken as absolute law by uninformed users who are for the most part quite ignorant of their legal rights.

The second example comes from a Copyright Clearinghouse Center notice distributed by publishers who subscribe to their services. This is another example of official-sounding pronouncements intended to intimidate uninformed users, and perhaps even discourage those users to dig deeply enough to discover where they stand.

> Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by The Bureau of National Affairs, Inc., for libraries or other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $0.50 per page is paid directly to the Copyright Clearing House Center, 21 Congress St., Salem, Mass. 01970 or to the Bureau of National Affairs, Inc.

Patterson and Lindberg indicate this is an example of making private law in total disregard of public law, making unconstitutional use of copyright under both the copyright clause, and the free speech clause of the First Amendment, and making unlawful use of copyright under the 1976 Copyright Act.

The danger to all the freedoms implied in the free exchange of ideas is very real, very immediate. So the answer is yes, the way copyright law is being interpreted by contemporary courts, the freedom to exchange ideas is moving toward extinction. We're in a time of information-related revolution. And the bottom line is very clear: it's a critical time and we better, as a society, as a people, as responsible world citizens, get our copyright act together, before it's too late.

It seems clear that the nature of copyright must be decided, and judicial decisions must rest on constitutional grounds. Otherwise, special interest groups wielding considerable economic power, will continue turning copyright into a tool for guaranteeing a profit, sanctioned monopoly, and a universal tool for censorship.

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ACCESS TO THE INTERNET BY PEOPLE WITH DISABILITIES

by: Mike Tompson
CANTO, New Mexico State University

Paper not submitted for publication

WWW AT NMSU
Developing Campus
Policies and Guidelines

by: Shaun Cooper &
Brian Ormand,
New Mexico State
University

Paper not submitted for publications

WRITING SPECIFICATIONS FOR PC PURCHASES

Paper not submitted for publication

by: Peter Shkabara,
Western New Mexico
University

NSF FUNDING INITIATIVES IN COMPUTING AND NETWORKING

by: Art St. George,
University of New
Mexico

This paper reviews major NSF funding initiatives for FY1995. While the Foundation has Directorates in Biological Sciences, Engineering, Geosciences, Polar Programs, Mathematics and Physical Sciences, Social, Behavioral and Economic Sciences, this paper focuses on the Directorates of Education (EHR) and Computer and Information Science and Engineering (CISE). The Foundation promotes and advances scientific and engineering progress in the United States by sponsoring research and education; it does not conduct research. Foundations wide programs range from individual research awards, usually in the form of grants, to academic research infrastructure and conference and workshop support. Underrepresented populations are served through a variety of funding programs, including research planning grants,career advancement awards, research opportunities for minorities and facilitation awards for persons with disabilities.

CISE activities in high-performance computing include the Gigabit Network Testbeds, Grand Challenge Research, Fellowships and Infrastructure, High Performance Languages and Virtual Reality Applications. CISE also sponsors the NSFNet Connections program for schools, libraries and higher education institutions.

The EHR Directorate offers two programs of interest to computer science and networking professionals: Applications of Advanced Technologies and Networking Infrastructure for Education. The latter is a joint program with the CISE Directorate.

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IMPLEMENTING A GROUPWARE SERVICE REQUEST TRACKING SYSTEM

Automating the Computer People

by: Anna Dyson &
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Paper not submitted for publication

WORLD WIDE WEB HOMEPAGES: AN EXAMINATION OF CONTENT AND AUDIENCE

by: Betty Reynolds, William Kincade & Kay Krehbiel, New Mexico Tech.

ABSTRACT

In this paper we will show how the content of a World Wide Web page is selected and how an examination of the intended audience influences content. Examples from the New Mexico Tech Library homepage will show what sources are selected and what level of detail is appropriate for the intended audience. Since the New Mexico Tech Library serves both an academic and a community audience, most of the examples will be applicable to all types of libraries and information agencies.

World Wide Web Homepages: An Examination of Content and Audience

The New Mexico Tech Library homepage (URL:http://www.nmt.edu:80/~nmtlib/) was created with the combined effort of the professional, support staff, and student assistants at the library. The content of the homepage is the result of an examination of the potential audience and how to meet their information needs. This paper will categorize the information needs of the audience by using the model developed by Greer and Hale (Greer and Hale, 1982) of the six functions of libraries and information agencies: informational, educational, research, cultural, recreational, and bibliographic/archival.

The homepage for the New Mexico Tech Library originally evolved from a class project of Kathleen Le Febre and William Kincade in the Emporia State University MLS program. In this project, the World Wide Web was used to create a "community database" of local information considered useful to New Mexico Tech students. In this form, the database contained information such as local sporting event schedules, restaurant menus, and driving distances to cities throughout the state. From this beginning, the homepage evolved in three directions: one continuing and broadening the community information portion, one pointing to select information resources available from the web, and the last as an alternate means of displaying user guides. From here, the homepage has been modified into its present form.

In designing the homepage for the New Mexico Tech Library, the staff acted as a committee of the whole. The process involved an idea or effort, usually of an individual, who then submitted their work to the staff. The staff then decided whether this effort fit into the homepage and what modifications might be necessary to modify the preliminary individual effort to fit the purpose of the homepage. This process, moving from individual effort to committee agreement, is the reverse of the way many homepages are designed. The ability to reverse the usual process of homepage design is possible because of the small library staff at Tech. It has the potential advantage of speed of implementation at the possible drawback of less input from a variety of sources. A thorough user survey, a desirable first step in implementing new projects, was not possible given limitations on staff time and resources.

According to Greer and Hale, libraries and information agencies serve six fundamental functions. These are informational, educational, research, cultural, recreational, and bibliographic/archival. This model will be used in examining the content of the NMT homepage.

The primary audience for the homepage is considered actual users of the library. This audience consists of the students, faculty, and staff of New Mexico Tech, which make up 90 percent of the total, with community borrowers making up the remaining 10 percent. A secondary audience consists of potential users of the library. These include potential students and individuals curious about the university. A third audience for the homepage consists of remote users, largely the staff of other libraries, who may be curious about other library homepages. Because of the broad audience for the homepage, it was determined all six library functions should be addressed.

Reference desk observation showed the most important functions for faculty and students of Tech are information, education, and research. It was determined through the combined observation and reference desk experience of the staff that the primary information needs of the student concerned library policies and procedures, career information, and resources by subject. Educational and research needs closely follow the curriculum of the university, which is mainly engineering and physical science, therefore most of the resources by subject pages emphasize these areas. Additional information concerning recreational and cultural activities, while not a primary focus of the homepage, were added because they would help meet an information need of prospective and new students, faculty, and staff.

The greatest source of input on what to include in the homepage is questions asked by customers at the reference and circulation desks. From these questions, the content of the homepage can be extrapolated. A second source is direct input from people who have viewed the homepage and commented on it.

The examination of this audience results in a homepage that seeks to fulfill their information needs from the outset. The page itself starts with a picture of the library rather than a stylized logo. This picture, which may seem unimportant, does show remote users what the building looks like so they can identify it should they ever come to the campus.

In its present form, the New Mexico Tech homepage (URL:http://www.nmt.edu:80/~nmtlib/) is divided into seven major categories: Tech Library Information; LIBROS (the online catalog); NMT Course Specific Links; Connect to Other Library Catalogs and Web Pages; Resources by Subject; Career Information; and Information About Socorro and the Surrounding Area. Each category seeks to fulfill one or more of the information needs of the customers.

The Tech Library Information (URL:http://www.nmt.edu:80/~nmtlib/libinfo.html) page is subdivided into nine categories. These include pages on how to use the library, a map of the library, a tour of the library, hours, services by department, meeting room reservations, new books and journals, the Tech Library staff, and our mission and goals. Somewhat self-explanatory, this page is primarily designed to meet the informational category of information needs of library customers.

A gateway to the online catalog, LIBROS, is provided by the second category. In this respect this page functions as the online catalog and as such meets the b

Bibliographic information needs of the customers.

Connect to Other Library Catalogs and Web Pages in New Mexico and Around the World (URL:http://www.nmt.edu:80/~nmtlib/brochures/OTHER/otherlibs.html) provides a quick gateway to various New Mexico library online catalogs and various library and other organization web pages. As a connection to other online catalogs, this page serves a bibliographic function. As a connection to other web pages, serves informational, cultural, or recreational functions.

N M T C o u r s e S p e c i f i c L i n k s (URL:http://www.nmt.edu:80/~nmtlib/reserves/reserves.html) will consist of course material such as course reserves, syllabi, readings and other non-copyrighted works useful in course instruction. This category is clearly targeted at meeting educational information needs.

Resources by Subject (URL:http://www.nmt.edu:80/~nmtlib/subject/subject.html) is presently divided into 47 separate categories. These pages consist of more than a list of pointers to other WWW resources, as they include lists of materials deemed by the NMT library staff as the best resources on the topic. In this respect, the pages are customized to the collection and function as a pathfinder. Most of these categories, such as Astronomy and Astrophysics, are designed to meet research or informational needs. Several categories, such as genealogy, are outside of the range of educational programs offered by the university. In this respect they help fulfill cultural and recreational needs.

Career Information (URL:http://www.nmt.edu:80/~nmtlib/subject/jobs.html) is one of the most important informational needs of the Tech student population. Feedback from the reference desk indicated employment information is second only to library use information in number of inquiries. Career Information is under the information function category in the model.

Information about Socorro and the Surrounding Area (URL:http://www.nmt.edu:80/~nmtlib/LOCAL/local.html) is primarily focused on meeting the cultural and recreational needs of the library's customers. This area also helps to meet informational needs, particularly of new and prospective students, faculty and staff.

The six information functions identified by Greer and Hale are therefore addressed by the various categories included in the homepage. Research needs are primarily addressed by the Resources by Subject page. Meeting Informational needs are the main purpose of the Tech Library Information and Career Information pages, although informational needs are also somewhat addressed by all the second-level pages. Educational needs are the main purpose of the NMT Course Specific Links page and are a secondary purpose of the Resources by Subject page. Cultural and Recreational needs are the main functions addressed in the Information about Socorro and surrounding area page. Bibliographic/Archival information needs are addressed by the link to the online catalog LIBROS.

Since the Tech Library Homepage is designed to serve all functions of a library, it is quite large and detailed, particularly in the informational, educational, and research areas. While the first stage of building the homepage is virtually complete, like all homepages, it remains a work in progress.

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CONCRETE RESULTS IN THE VIRTUAL REALIY CLASSROOM

by: Ester Peralta, University of Texas El Paso

Paper not submitted for publication

HOME PAGES AND OTHER THINGS THAT GO BUMP IN CYBERSPACE

by: Phillip Escue,
Computer Services
New Mexico Highlands
University

Home Pages and Other Things That Go Bump in Cyberspace

Or

How to create a home page without a programmer

by

Phillip C. Escue

The Problem

- HTML can be formidable to a non-programmer
- Most tools for creating Home Pages were designed for programmers
- Most people have documents that they want to include in a Home Page

Some Solutions

- HotDog Pro
- HotMetal
- HTML Write
- HTMLEasy
- Internet Assistant
- Internet Publisher

BEST COPY AVAILABLE

Where to Find Them

http://www.yahoo.com/
Choose Computers and Internet
Choose Internet

- Choose World Wide Web
- Choose HTML Editors
- Another Place for PC Users is: http://cwsapps.texas.net/

HTML Basics

HTML tags consist of left angle bracket (<) followed by command closed with a right angle bracket (>).

- Tags are usually in pairs, an beginning tag to turn a function on and a ending tag that turns the function off. The ending tag usually has a slash (/) that follows the left angle bracket (</).

HTML Basics Cont.

Example: Begin bolding bolding off
Everything between the and the would be in bold characters

HTML Basics

- One of the most confusing aspects of HTML is the way it handles text.
- HTML sees tabs and spaces of greater than one space, as one space
- HTML sees blanks of more than one line, as one line
- There is a way to keep the format on your text

HTML Basics Cont.

To learn more about HTML, go to:
http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html

The Answer For Some

Probably the two most used word processors are Microsoft Word and WordPerfect; both have HTML editors that can be used to create pretty good home pages and most can be done without a programmer.

Microsoft Internet Assistant

- *Was the first Word Processor/Web Browser/HTML Editor combination to come out*
- *Works with Word 6.0 and Word 95*
- *If you are familiar with Word, it is very easy to use*

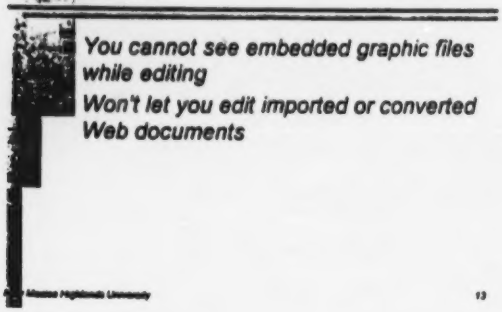
Microsoft Internet Assistant Problems

- *It is slow to use on any machine that is not a Pentium*
- *The browser is only adequate*
- *Limited on what you can create*

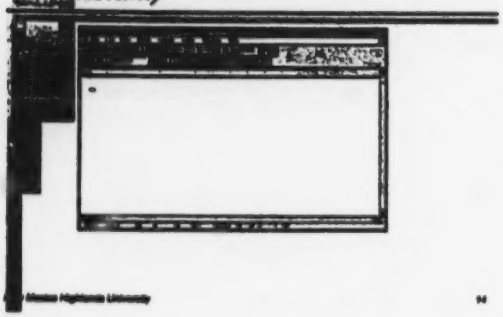
WordPerfect Internet Publisher

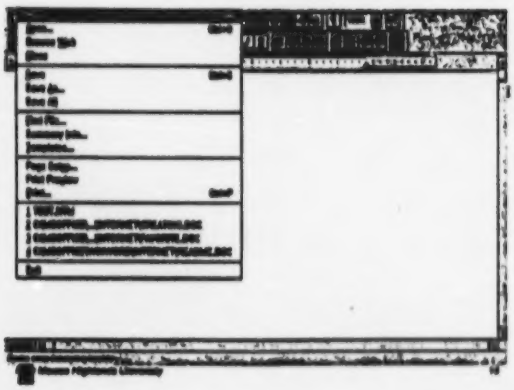
- *Works with WordPerfect 6.1*
- *You get a free copy of Netscape Navigator 1.1*
- *You get a free copy of Novell's Envoy file-viewer*
- *Button bar increases productivity*

WordPerfect Internet Publisher Problems



The Beginning (Internet Assistant)





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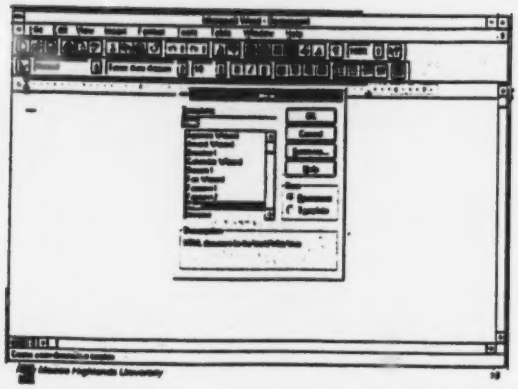

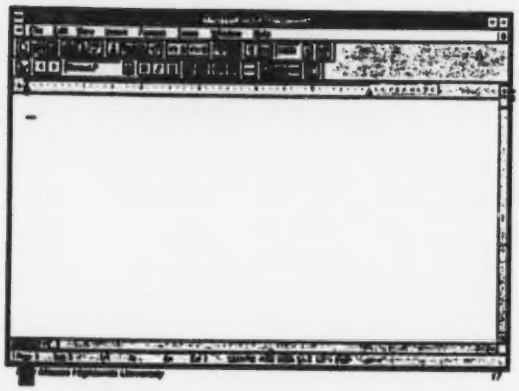

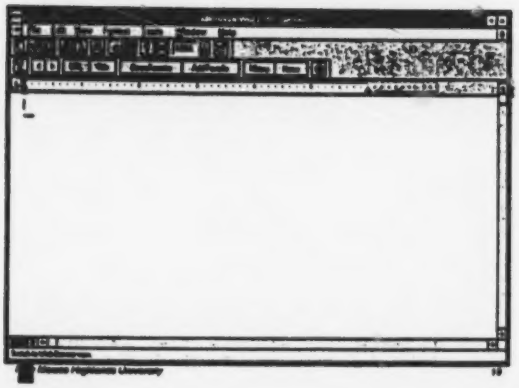

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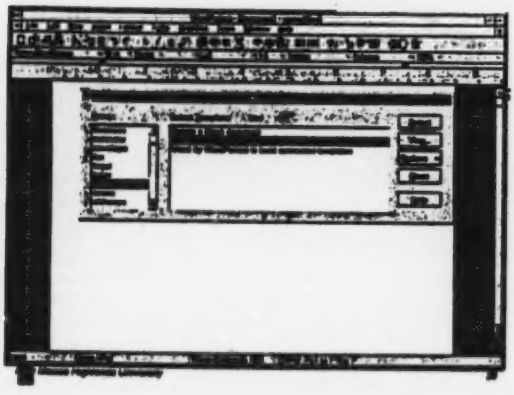

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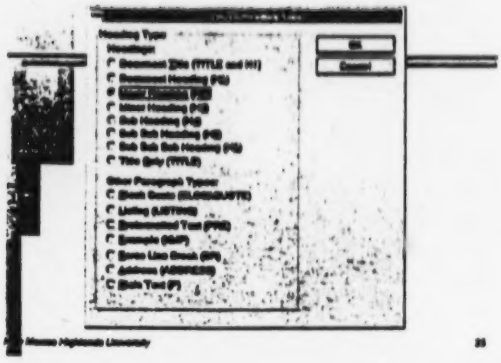

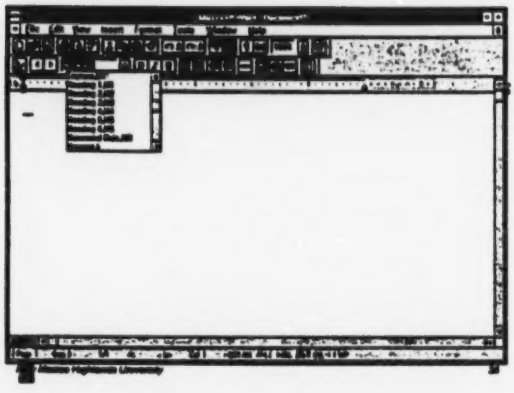

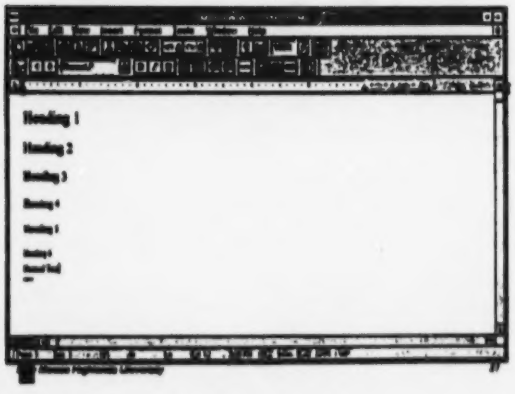

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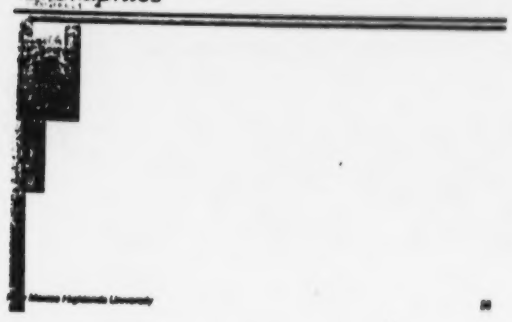

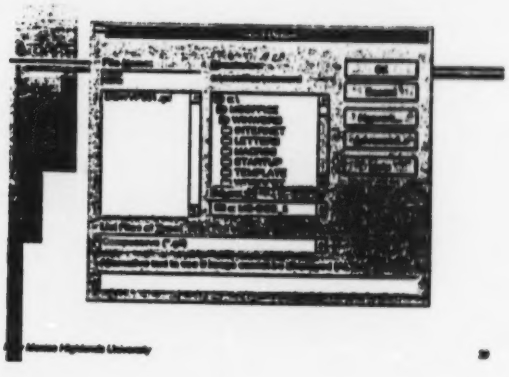

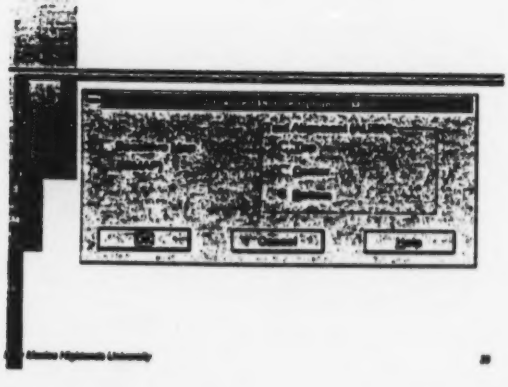

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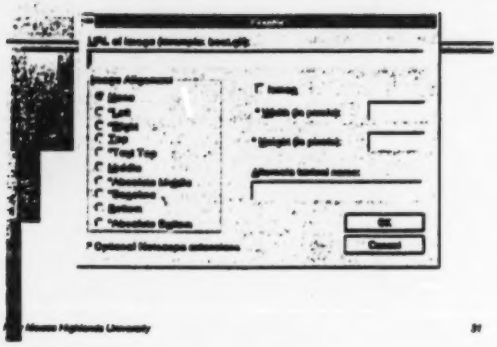

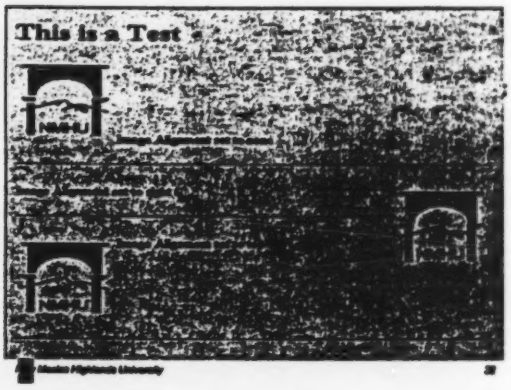

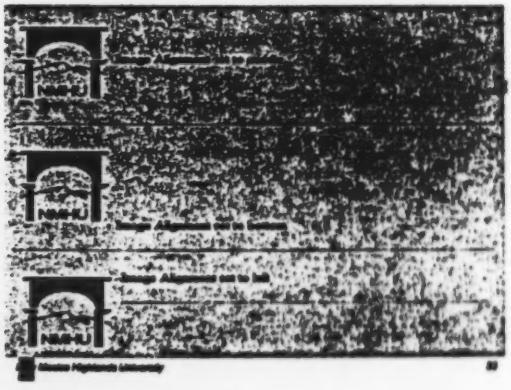

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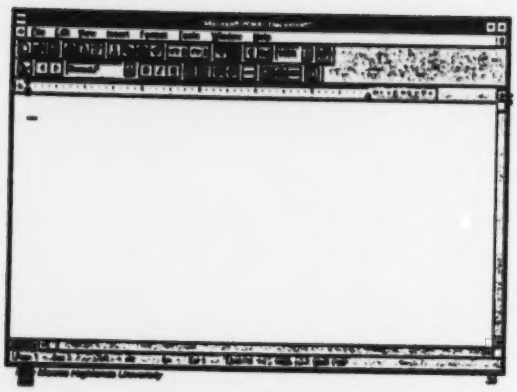

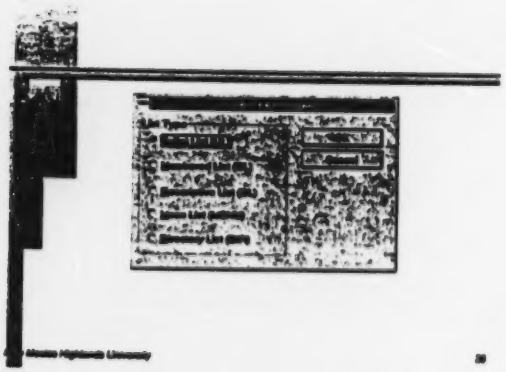

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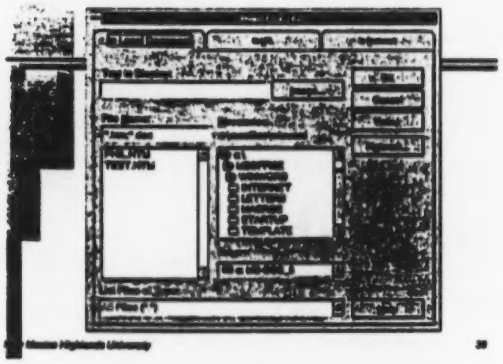

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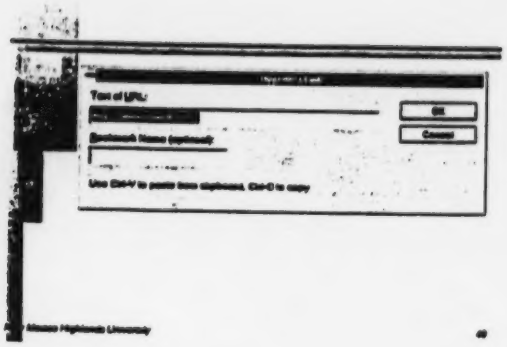

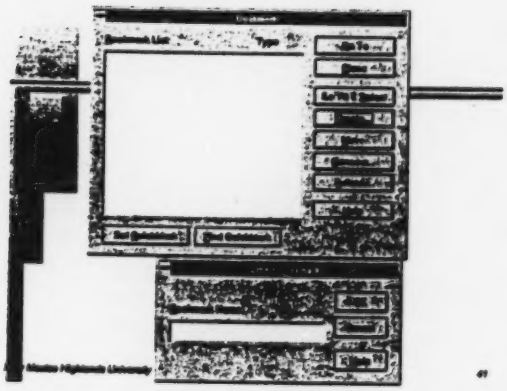

HTML 3

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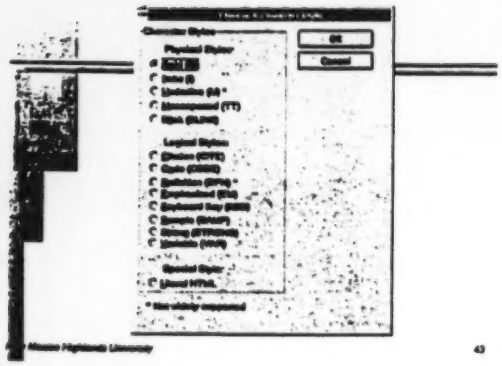

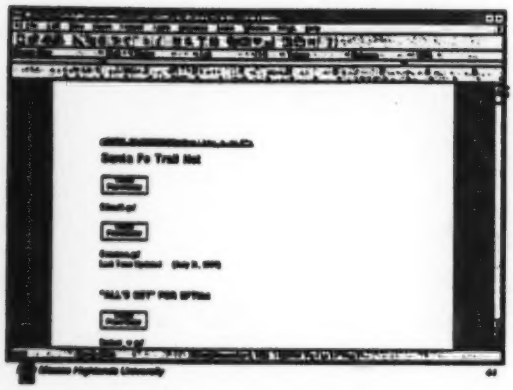

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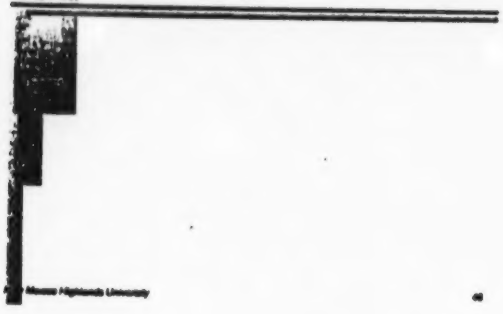

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SATAN
What's all the Hype About?

by: Jim Herbeck,
University of New Mexico

Paper not submitted for publication

GOVERNMENT INFORMATION ON THE INTERNET

Implications for Libraries and Communities in Eastern New Mexico

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Whether it is praising the "interconnectedness" we will all soon supposedly enjoy or condemning the darker side of commerce the it is accused of encouraging, it is hard to get through a newscast or a newspaper without hearing something about the Internet. Librarians, with all their resistance to change in the past, seem to have jumped on the bandwagon as well, which could lead to problems with public access to information if this enthusiasm is not tempered with reason. In this paper I hope to address issues affecting access to government information on the Internet and how this shift toward electronic dissemination effects an isolated region such as eastern New Mexico.

In his article "Librarians, Self-Censorship and Information Technologies" (1994), John Buschman voices appropriate concern over librarians' rush to embrace new technologies at the expense of books and other print materials, which might in the end be more useful. "Self-censorship can be thought of not as not assessing, estimating, or judging some of the dimensions of our library decisions - our socially constructed proscriptions and prescriptions - thereby leaving assumptions unexamined and some results unchecked for the public we serve" (p. 221). Buschman contends that this unexamined approach to technology is due to the higher cultural status of electronic resources. He claims that "certain kinds of knowledge (scientific, measurable, profitable) have a social prestige and more weight as true knowledge,"and continues, "as a result of their natural affiliation with scientific rationality, information technologies hold a very high status in our culture" (p. 222). Librarians, according to this logic, will be more willing to invest in an expensive networking project or set of databases rather than keeping up the collection of monographic or other print materials, if the technological project is seen to have more prestige. The assumption is that access to information is more important than the ownership of a physical product. In terms of the Internet, this might not always be the case. To have access to the Internet is not to have all of the information you might want at your fingertips.

In terms of government information, print sources go out of existence and are replaced with either a CD or an Internet site without notifying the public, in particular depository librarians of the shift. This leaves it up to the information seeker to find the material if they have the technological ability to do so in the first place. These types of problems could be remedied with a more cohesive government information policy. Agencies such as the Government Printing Office are making efforts in this direction, but libraries and the public might not be ready financially, to make this shift to electronic information.

Unfortunately, information policy at the federal level is complex and not always made with the end-user in mind. It is a collection of many policy documents from every branch of the government. These different policies are not coordinated in many cases leading to competition and duplication. Government information policies are important to libraries in that libraries are part of the larger community of government information providers. In the case of depository libraries, their very existence and the materials they can choose from are dictated by federal information policy.

The Federal Depository Library Program established through Title 44 of the U.S. Code in 1895 is the information policy which provides the Federal Government with the means to disseminate government information to the

taxpayers who fund its production. The program unctions by distributing these publications, free of charge, to approximately 1,400 Depository Libraries through the Government Printing Office (GPO). These libraries then provide free public access to the information to the communities in which they reside.

Over the past decade, discussion of electronic information and the way it should be treated in terms of a product disseminated by the GPO has been the topic of a sometimes heated debate. Once electronic information began to appear in force on the Internet and was considered official government information, the library community as well as other groups praised this newfound access.

In her article "Uncle Sam Online: Government Information on the Internet," Susan M. Ryan states "the Internet, which makes government information available to the consumer the minute that it is posted, has begun to provide the mechanism by which the public can have instantaneous access to the data produced by their government" (1994, p. 151). Blake Gumprecht was equally excited about the prospects of the Internet as the mode of dissemination for government information when he stated, "a variety of other proposals suggest that in the future an ever increasing volume of government information will be available online, sometimes exclusively" (1994, p. 19).

Eventually, doubts about the efficacy of the Internet began to surface. Amy Schatz of the Wall Street Journal questioned the value of the information that actually makes it online. "After a look at what Uncle Sam has dumped out in Cyberspace, however, the public may decide to keep its distance from the new electronic democracy," she continues, "when deciding what information to put online, departments and agencies are hardly selective" (1995, B1:1). Some sites are so technologically advanced, including graphics, audio and video clips that few homes or libraries have the equipment to handle them (Browning, 1994). There is duplication as well. The House Information Service provides much of the same information as the Thomas system spearheaded by Newt Gingrich through the Library of Congress and the mandated GPO Access System of the Government printing office. With more coordination, this duplication and ultimately this waste of funds could be avoided.

Simply stated, even if one has access to the Internet, it might not give as much access as the user might hope. While many Depository libraries with Internet access have their own locators, the federally mandated Government Information Locator Service or GILS, which promises to ve the one-stop locator for government information on the Internet, is still in its test phase.

Electronic information is cheaper to produce, takes up less space and is generally a more effective format for searching certain databases and indexes. On the other hand, the "fully-burdened price" (Crawford & Gorman, 1995, p. 99) of electronic information, including the costs of equipment are higher than traditional print formats. In order to effectively implement electronic information as a resource in a library, the institution needs to have the funds for equipment such as networked workstations, LAN software and hardware, and CD-ROM towers. This is an ongoing cost as equipment needs to be upgraded and sources replaced as technology changes.

In the case of Eastern New Mexico University, the library is one of the last buildings to be networked due to the concrete structure of the library, thus prolonging our transition from text based access to the Internet to a graphical mode. The terminals we do have are not workstations so to speak, and are not windows compatible. As a result, when the building is networked, we will have to invest in workstations for the reference area to give access to our new capability.

Even with these hindrances, the trend in the dissemination of government information is toward electronic media. In fact legislation considered by Congress this term would have effectively shut down the production of print materials to be distributed to the Depository Libraries. During the week of June 18,1995, the House approved a cut that halved the budget of the Government Printing Office. The costs of printing materials from the various departments and agencies would have been shifted to the agency that produced the publication, rather than the GPO. The agencies themselves are already dealing with cuts and most likely would not have the funds to produce the additional runs of publications to be distributed to Depository Libraries. Funding for the dissemination of electronic products from Executive Branch agencies would have been included in the legislation, but no provision for the printing of important documents such as the Congressional Record and the Federal Register had been made.

The bill did not pass in the Senate and the proposed cuts were not made. In response t o this legislative development, the Government Printing Office is engaging in a study to show how the migration to electronic dissemination could be accomplished while ensuring public access to this information. The issue will return again and again in the name of downsizing government. One proposed remedy to the lack of Internet access by individuals has been to put government information kiosks in post offices. Libraries in this proposal have been deemed to be so out of the technological loop that the government is considering a bypass of the already standing public information system. Proponents of this system hope that agencies will be able to save money by carrying out transactions online. The savings would be used to fund the infrastructure of the program. In their article "The Post Office and Public Libraries," Jean Armour Polly and Steve Cisler contend that "advocates of kiosks assume that little assistance will be needed," and continue "those of us who have worked with OPACS (online public access catalogs), audiovisual equipment, and especially the photocopy machines in public places know that the introduction of even bullet-proof, easy-to-use, well-designed technological devices presents new challenges for the public services staff" (1995, p. 30). In theory, the combination of the equipment headache and the postal service could be disastrous.

Eastern New Mexico tax payers have every reason to watch this debate closely. Depository Libraries are few and far between and are struggling to keep up with the influx of electronic media under the current system. To illustrate the technological isolation of the region of eastern New Mexico, I conducted a survey of academic, public and special libraries. Of the thirty-three questionnaires that were distributed, twenty-three returned completed surveys giving a response rate of 69%. Based on these responses, I have made generalizations for the whole group.

Of the group, two are selective federal depository libraries, meaning that they select only a percentage of the items available through the depository program. One of these libraries selects 43% and the other approximately 15%. Both have Internet access which was text based at the time of the survey, with plans to upgrade to a graphical interface sometime during the academic year. Both libraries have CD-ROM capabilities as well. One of the libraries only provides Internet access to faculty and staff, hoping to expand service to all patrons next semester. If they do not have a publication that is requested, they get the print materials through interlibrary loan from the regional depository library, which receives and retains everything distributed through the Depository Program.

Of the remaining twenty-one respondents, four have Internet access. One of these four has a graphical interface such as Netscape. All of these have CD-ROM capabilities. If they do not have the materials requested, they get them through interlibrary loan from a regional depository or a local selective depository.

Two of the remaining seventeen libraries plan to be on the Internet by the end of the year. One of these will have modem access to the Internet and a text-based interface and the other plans to be hardwired with a graphical interface if they get funding for new workstations.
Both of these libraries have CD-ROM capabilities. If they do not have the materials, they either send the patron to the local selective depository or request the materials through interlibrary loan.

The remaining fifteen respondents have no Internet access at all. Seven of this group have no CD-ROM capabilities. If they do get a request for a government publication they request the item through interlibrary loan, refer patrons to local depositories or purchase the item if it is deemed to be of high use potential.

Based on the results of this survey, it seems obvious that a majority of the participating libraries would not be able to adequately fill documents requests if only electronic government information was available. If the GPO was to lose its printing capacity for the depository library program, and shift to only electronic dissemination, these libraries might not follow along with the transition. In terms of interlibrary loan for these libraries, the depository or other lending institution would have to access the materials, print them and then send it to the requesting library. Aside from the ecological costs of reprinting an item every time it is requested, the real cost of paper and ink to libraries would be considerable (Crawford & Gorman, 1995).

The Depository Library Program is the tax payer's interface with the information the government produces. If this access point disappears or is made inaccessible, eastern New Mexicans would be left up to their own devices to obtain this important information. Census data shows that New Mexico is second on the list of states that have households without telephones, surpassed only by Mississippi. One in eight New Mexico households lack telephones. The median household income of the state is also well below the national average (Bureau of the Census, 1994). Assuming that these households have computers, there would be no way for them to access the information distributed over the Internet. It is more likely that these households are without computers as well, which would leave them isolated from this valuable information.

Unless Newt Gingrich's deficit enhancing proposal to give a tax credit to allow America's poor to buy their own personal laptop and follow the rest of us into the 21st century is realized, the technological have-nots, including many New Mexicans will become increasingly disenfranchised from the workings of the Federal government (Kinsley, 1995). It is important, then, for librarians and information professionals to lobby policy makers to keep the lowest common denominator of government information dissemination accessible to all Americans.

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SECURITY PRACTICES & POLICIES

How I Kept My Boss Out of Jail

by: David Grisham, University of New Mexico

Paper not submitted for publication

POISE BIRD OF FEATHERS

General Meeting of NM POISE Users to meet with Campus America Account Manager, Sally Collins

Paper not submitted for publication

BUILDING COOPERATIVE NETWORKS IN NEW MEXICO

by: Jeff Harris, New Mexico State University

Paper not submitted for publication